ANNOTATIONS

ON

THE ENGLISH LITERATURE

OF THE

ENTRANCE COURSE FOR 1882.

BY

REV. R. ROBINSON.

———

CONTENTS.

ANNOTATIONS

ON

THE ENGLISH LITERATURE

OF THE

ENTRANCE COURSE FOR 1882.

(LETHBRIDGE'S SELECTIONS.)

JOHNSON.

Dr. Samuel Johnson was born at Lichfield in the year 1709. He was the son of a bookseller. He began his education at the Free Scho1 of Lichfield, but in 1728 he went to Pembroke College, Oxford. Being too poor to remain there, he left it in 1731 without a degree. Soon after, his father died, leaving him so poor that he became an usher in a school at Market Bosworth. In 1735 he married Mrs. Porter, a widow. She brought him some money, and with that he opened a school near Lichfield, but he had only three scholars, one of whom was David Garrick. At th s time he began his tragedy of "Irene." In 1737 he went to London, where he wrote for several years for the "Gentleman's Magazine." In 1749 appeared his "Vanity of Human Wishes." In 1750 he commenced a periodical paper called the "Rambler," which was continued for two years. About this time his wife died. In 1754 he visited Oxford, and in the next year his dictionary appeared, having taken him eight years to compile. He next wrote the "Idle," which was published in a weekly paper; and on the death of his mother in 1759, he wrote the romance of "Rasselas." George III granted him a pension of £300 a year in 1765. The next year he became acquainted with Boswell, and in 1773, they visited the Western Islands of Scotland together. Soon after, the University of Oxford sent him the degree of LL.D. His last work was the "Lives of English Poets," which he began in 1778. In politics he was a Tory, and was noted for his independence of mind. He died in London in 1784.

Page.

.29. *Ponderous.*—Heavy.

Antithetical.—(Gr. *anti* against and *tithemi* to place.) A placing of one thought against another, so as to

contrast with it. For example, on page 34 (10th line · from the bottom): "Finding ourselves in age less regarded, we less regard others." Here *being less regarded* is placed in antithesis to *less regarding others*. Or at page 38 (10th line from the bottom): "Your imagination prevails over your skill, and you now tell me rather what you wish than what you know." Here "imagination" and "skill" are antithetical, and so also are "wish" and "know."

DESCRIPTION OF A PALACE IN A VALLEY.

(Taken from the tale entitled "Rasselas.")

29. *Credulity*—(L. *credo* to believe.) Too great readiness to believe.

„ *The whispers of fancy.*—What your fancy or imagination tells you. (A man's fancy is supposed to "whisper," or speak softly to him; because when a man is indulging his fancy, his mind is supposed to be in a reposeful state, undisturbed by outward circumstances, or by any urgent call to immediate activity.) The fancies that your mind indulges in. (Figure personification.) . .

.To "listen with credulity to the whispers of fancy," means to be too ready to believe everything to be real which your fancy pictures to you.

„ *Pursue with eagerness the phantoms of hope.*—("Phantom" from the Greek *phainomai* to appear ; an appearance. Hence, an airy appearance that is not substantial.) To pursue a phantom is to seek to obtain something which may appear attainable, but which being unsubstantial (like an apparition or a ghost) can never be seized. So men hope for many things, and try to obtain them, but they cannot be realized ; they are only phantoms.

„ *That age, &c.*—That when you become old, you will be able to realize all that you hoped to do when you were young.

Page.

liberal giving, and the Nile is said to be bountiful because there is a season of the year when it fills to overflowing, and covers with its waters the country through which it flows. The river is personified as the Father of Waters, and is supposed, out of its generosity, to pour down large volumes of water which, overflowing the land on either side, fertilizes it, and so helps to produce plenty of food.

" 29. *Plenty.*—(Parse as a noun.) Abundant food.

" *Scatters over the world, &c.*—Conveys to all countries the corn grown in the land of Egypt. (By the "harvests" is meant the corn that is grown in Egypt, which, as already stated, owes its fertility to the periodical overflowings of the Nile. And it was along this river that large quantities of corn used to be conveyed out to sea, and so borne to the people occupying the Mediterranean coasts.

" *Monarchs.*—(Gr. *monos* sole, only, and *arkhos* a chief or ruler.) The sole ruler of a country is called a monarch.

" *Monarchs of the torrid zone.*—(The torrid zone—from *torridus* burning hot. and *zona* a girdle or belt,—is that broad belt of the earth between the tropics where the sun is vertical at sometime of the year, and where there is always considerable heat.) Kings of countries situated within the torrid zone.

" *Private palace.*—This may mean either a residence from which the public were excluded, or a palace which was the private property of the king.

" *Abyssinian royalty.*—A metonymic for the Abyssinian king.

" *Till the order, &c.*—Till it should be his turn to succeed to the throne, *i.e.*, to become king.

" *The wisdom or policy of antiquity.*—The wise people and statesmen of ancient times.

" *Destined.*—Appointed.

" —As the residence.

29. *That the deficiencies,' &c.*—That what is wanting just now, you will obtain hereafter: that is, that you will be able to make up afterwards for your present defects.

„ *The morrow.*—The future time.

„ *Attend.*—/Imperative mood, agreeing with its subject "ye."

„ *Rasselas*—This is an entirely fictitious character. He is supposed in this tale to have been a Prince of Abyssinia, a country to the south of Egypt, who was made to live in a private palace, removed from all intercourse with the outer world, with every means at hand to minister to his comfort and happiness The tale goes on to show how the attempt to secure happiness and contentment by careful separation from the cares and activities of mankind generally, must result in failure.

„ *Emperor.*—(L. *impero* to command. An *imperator* was the commander of an army.) The word emperor, however, has since come to be applied to the ruler of an empire, and it is usually associated with the idea of absolute sovereignty.

„ *The Father of Waters*—The Nile, which flows through Egypt and forming a delta, falls into the Mediterranean.

„ *Begins his course.*—("Course" from the Latin *curro* to run.) Begins to flow. (For a long time the belief was that the Nile had its source in Abyssinia, although no one had yet traced the river to its source, so as to settle the question. The actual source remained a mystery till very recently, when the Nile was found to flow out of the Lake Victoria Nyanza, beyond Abyssinia, on the south. The statement in the text, therefore, that the Nile begins its course in Abyssinia is not correct, although in Dr. Johnson's time it was generally believed to be true)

„ *Whose bounty, &c.*—("Whose" has for its antecedent "Father of Waters.") By "bounty" is meant

30. *By a stream.*—By means of a stream. (This stream
prevented the superfluous water from overflowing
the surrounding land.

,, *Cleft.*—(From the verb to *cleave.*) A fissure or
opening.

,, *From precipice to precipice.*—From ledge to ledge of
rock.

,, *Diversified.*—Made diverse or different. (There
would ordinarily be just the green grass along the
the banks; but here and there were flowers of
different colours mixed up with the green grass,
giving the banks a many-coloured appearance.)

,, *Every blast.*—Every time the wind blew. ("Blast"
from the verb to blow.)

,, *Shook spices from the rocks.*—The trees grew along
the mountain slopes, and every time a wind blew
through the branches, the spices that they bore
fell to the ground.

,, *From the rocks.*—From the trees growing on the
rocks.

,, *Every month dropped fruits,* &c.—(Prosopopœia.)
This may mean, either that the trees bore fruits
every month, or that there was some kind of fruit
peculiar to each month.

,, *Dropped fruits,* &c.—Fruits do not drop till they are
ripe. The meaning is, that there were ripe fruits
to be had every month of the year.

,, *Browse the shrubs.*—(The verb to browse is used both
transitively and intransitively. When it is used
intransitively, it is followed by the preposition
"on"—to browse on. Here it is used transitive-
ly.) Eat the tender ends of the branches of the
shrubs.)

,, *Shrubs.*—(Strictly speaking, a shrub differs from a
tree in this, that whereas a tree has only one
stem growing out of the ground, a shrub has
several stems coming up together. The word
"shrub," however, is commonly used to denote a

Page.

• low, dwarf tree, and this is its meaning here. The author uses the word "shrub" instead of tree, because the leaves and tender branches of low, short trees would be more accessible to animals seeking to feed on them than those of tall trees, which would for the most part be out of their reach.

30. *Whether wild or tame.*—Adjectivial clause qualifying "animals."

,, *Circuit.*—The valley was a round space surrounded by mountains.

,, *Secured.*—Protected. •

,, *Confined them.*—Enclosed them on all sides.

,, *Feeding.*—(An intransitive verb, which is really a verb whose action reverts to the agent. " Flocks and birds feeding " is equivalent to "flocks and birds feeding themselves."

,. *Feeding.*—Speaking loosely, to feed (intransitive) is to eat ; but strictly speaking, there is a difference between feeding and eating. To eat is to take in anything . but to feed is to take in that which is accepted as food.

,, *The beasts of chase.*—Animals kept to be chased or hunted.

,, *Frisking.*—Jumping about.

,, *Lawns.*—Open grass covered ground.

,, *Bounding on the rocks.*—Leaping from rock to rock.

,, *Subtle.*—Cunning.

,, *Frolicing*—Playing about.

,, *Solemn elephant.*—So called on account of its heavy appearance and slow and deliberate movements.

,, *Reposing.*—Resting.

,, *The shade.*—Of a tree or rock.

,, *All the diversities.*—All the different kinds of animals, trees, and other things that were to be found in the world.

,, *Brought together* —Collected together in this valley.

Page.

30. *The blessings of nature were collected.*—Everything, whether animal or vegetable or mineral, &c., that was considered good, was brought into the valley.

„ *Its evils, &c.*—Everything that was considered hurtful was removed out of the valley ("extracted"), or kept out, that is not allowed to be brought into the valley (excluded.)

„ *Supplied, &c.*—Yielded the food that was needful for the support of the men and animals living in it.

„ *Necessaries.*—(Noun.) Things necessary for food.

„ *Delights.*—Pleasures, amusements.

„ *Superfluities.*—Superfluities are contra-distinguished from necessaries. The things that are needful for a man to have, and without which he would not live with comfort, are necessaries of life. Anything beyond these, which he could easily do without, is a superfluity. When the emperor came to the valley once a year, he brought many things for his children which were over and above what they needed for living.

„ *To the sound, &c.*—The opening was accompanied by music.

„ *Contribute.*—Help. (The Latin verb *tribuo* to divide, is derived from *tribus*, tribe, which again comes from *tres* three, from the circumstance that the early population of Rome consisted of three tribes, the Ramnes, Tities and Luceres. A tribe was therefore a third part, and from that it came to mean a class of people divided or separated from others. Hence the verb *tribuo* to divide. To *con*-(with)-tribute, is to give in common with others into a common stock; to *dis*-(from)-tribute is to give away to others; and to *at*-(to)-tribute, is to give or ascribe to another.)

„ *Seclusion.*—Separation from the rest of the world. The condition of the people of the valley, who were separate from the rest of the world.

30. *To fill up the vacancies of attention.*—To occupy the intervals of time between the different duties that had to be attended to.

„ *Lessen the tediousness of time.*—Lessen the weariness felt by those who have nothing to occupy their time with.

„ *The artificers of pleasure.*—Those who contrived means for giving pleasure.

„ *The festivity.*—The festive or joyful occasion, when the emperor visited his children.

, *Exerted the power of harmony.*—Played together on their several musical instruments.

„ *That they should pass.*—That they might be allowed to pass.

•, *Blissful captivity.*—Residence in the Happy Valley was a captivity or confinement; but it is called "blissful captivity" on account of the many pleasures associated with it.

„ *Whose performance, &c.*—Who could do something which not only contributed to the enjoyment of the princes, but which supplied some new source of enjoyment.

„ *Security.*—Safety from everything hurtful.

„ *This retirement*—This place of retirement, or withdrawal from the outside world: the Happy Valley.

„ *To whom it was new.*—Who had recently gained admission into it.

„ *On whom the iron gate had once closed.*—Who had once been locked into the valley.

The effect of longer experience.—Whether after remaining in the valley long, they still felt that they would like to remain there always, or whether they changed their opinion, nobody outside the valley could know, because they were never allowed to go out of the valley, so as to have an opportunity of speaking about the matter to those who were outside.

Page.

30. *New competitors for imprisonment.*—Additional people wanting to be allowed to live in the Happy Valley.

,, ·*Eminence.*—Raised ground.

,, *Paces.*—(A pace is the distance between the two feet in walking, measuring about 2½ feet) It took 30 paces to ascend from the back of the lake to the platform on which the palace stood.

,, *Designed.*—Intended.

,, ·*Turned into arches*—Were arched, i. e , rounded, so as to be dome-like.

,, *Massy.*—Heavy.

,, *Stone*—Stones.

,, *Joined.*—Participle qualifying "stone '

,, *Cement.*—A strong mortar put between the stones in a building to keep them together.

,, *By time.*—By means of, or with the help of, time ; i. e , in course of time.

31. *Deriding.*—Laughing at, i. e., refusing to be injured by.

,, *Solstitial rains.*—(1. sol the sun and sto to stand. The solstices, of which there are two, are those times in the year when the sun reaches its furthest point north or south of the equator) The rains that prevailed at the time of the summer solstice.

,, *Equinoctial hurricanes.*—Hurricanes that prevail at the time of the equinox, that is, the time when the sun enters one of the equinoctial points, making the day and night of equal length. (L. *equus* equal, and *nox* night)

,, *Reparation.*—Repairs.

,, ·*Fully known.*—Known as to all its chambers and parts.

,, *Who successively.*—Who, as they succeeded one another.

,, *Inherited, &c.*—Had the secrets of the palace communicated to them on their appointment to office.

Page.

31: *Suspicion herself.*—(Personification.)

,, *Square* – (Noun) Square block of building.

,, *Communication with the rest.*—Connection with the rest, enabling people to pass from one block of building to another.

, *Galleries.*—Covered passages

,, *Subterraneous* —(L. *sub* under, and *terra* the earth) Underground.

·.. *Column* —Round pillars or shafts of stone or other material helping to support a building

, *Unsuspected cavities.*—Hollow places whose existence was not suspected.

,, *A long race of monarchs* —Many kings in succession.

,, *Reposited.*—Placed for safety.

,, *Exigencies.*—Urgent necessities.

.. *Their accumulations.*—The different sums of money or other valuables that they had gathered.

,, *Not entered.*—Qualifies " tower." The tower was not entered. (Parse " entered " as a passive participle.)

,, *But by the emperor.*—Except by the emperor.

,, *Attended.*—Participle qualifying "emperor."

·, *Who stood next in succession* —Who would be the first to succeed the emperor when the latter died.

THE DISCONTENT OF RASSELAS IN THE HAPPY VALLEY.

31 *The sons and daughters of Abyssinia.*—The children of the Emperor of Abyssinia.

.. *Lived only to know.*—The only purpose in life was to enjoy pleasure in constant variety.

,, *Soft.*—Luxurious.

,, · *Vicissitudes.*—Changes

., *Pleasure and repose.*—There were no duties to be performed, no labour to be undergone Other people change from labour to repose with the princes

Page.

of the Happy Valley, the only change was from pleasure to repose.

31. *All that were.*—All those persons who were. (Parse " that " as a relative pronoun in the plural number, nominative to " were. "

,, *To delight.*— (Verb in the infinitive mood) To give delight.

,, *Gratified with.*—("Gratified," like "attended," is a passive participle qualifying "sons and daughters," —being gratified.) Realizing the enjoyment of.

,, *The sense.*—The senses : hearing, seeing, feeling, &c.

,, *Gardens of fragrance.*—Gardens, the air of which was filled with the sweet perfume of flowers.

,, *The fortresses of security.*—(L. *fortis,* strong.) Strong buildings so constructed as to keep those who were in them perfectly safe from the attack of any enemy.

,, *Every art was practised.*—Everything was done ; every means was employed.

,, *Their own condition.*—Their state of imprisonment.

,, *Sages.*—Wise men.

,, *Public life.*—Life in contact with the people outside the Happy Valley.

,, *All beyond the mountains.*—All the countries of the world on the other side of the mountains which formed the barrier around the valley.

,, *Regions of calamity.*—Countries where there was nothing but misfortune and suffering.

,, *Raging.*—(Verb " to rage, " which means to be violently excited.) Prevailing greatly.

,, *Where discord, &c.*—Where the people were constantly at strife with one another.

,, *Where man preyed upon man.*—(To prey is to feed by violence ; thus, the tiger preys upon the goat ; that is, the tiger seizes the goat by violence and devours it. So, when one man is said to prey

upon another, the meaning is, that he uses his superior strength, of whatever sort, to take advantage of that other, and to injure him for his own benefit.) Where one man seeks to benefit himself at the expense of another.

31. *Heighten.*—Increase.

   ,, *Opinion of.*—Belief in.

   ,, *Felicity* (L. *felix* happy) Happiness.

   ,, *Entertained*—With songs ; kept engaged with listening to songs.

   ,, *The subject of which.*—The subject of the songs. The songs were all about the Happy Valley, its pleasures, its comforts, &c.

   ,, *Appetites*—Desires.

   ,, *Excited.*—Stirred up, roused.

   ,, *By frequent enumerations, &c.*—By the people about them frequently making mention to them of the different kinds of pleasure there were to be had.

   ,, *Revelry and merriment, &c.*—Here is an instance of the antithetical, which is such a marked feature in Dr. Johnson's style : "Revelry and merriment," that is, feasting and amusements, are the opposite of business ; but in the Happy Valley, the business of the people was to enjoy themselves.

   ,, *The business of every hour.*—Every hour of the day was occupied with some pleasure or amusement.

   ,, *These methods.*—The ways described in the foregoing paragraph, by which the princes were induced to live contented in the valley.

   ,, *Enlarge their bounds.*—Get beyond the boundaries of the valley.

   ,, *In full conviction.*—In the full conviction or belief.

   ,, *All.*—Everything.

   ,, *That.*—Which. (Antecedent, "all.") .

   ,, *Art or nature could bestow.*—That could be made or devised by men (such as music and sports), or

supplied by nature (such as fruits, flowers, scenery, &c., which are all natural objects.)

31. *Pitied.*—(Has for its subject "few.")

,, *Whom nature, &c.*—Nature comes from *nascor, natus,* to be born.)   The princes were in the Happy Valley because they were born the children of the Emperor of Abyssinia. The valley was intended for them onl . The rest of mankind not being so born, could not enjoy the same advantage of living in the valley.

,, *Seat of tranquillity.*—This abode of peace and quiet—the Happy Valley.

,. *The sport of chance.*—(The word "sport," which means mirth, is used in two senses; it sometimes means the mirth itself, and at others, it means that which occasions mirth. Here it has the latter meaning; that out of which chance makes mirth.)   Exposed to all kinds of fortunes.

., *The slaves of misery.*—Subject to misery.

,, *All but Rasselas.*—Elliptical for—all except Rasselas were pleased with each other and with themselves.

32. *Pastimes.*—(From *pass* to spend and *time*   That by means of which the time is spent.)   Amusement.

,, *Solitary walks.*—Walks taken alone.

,, *Luxury.*—Luxurious good.

,, *Dainties.*—Different kinds of choice food.

,, *Abruptly.*—(L.*eb* from, and *rumpo* to break off; to break off from. Hence) Suddenly.

,, *In the midst of the song.*—Whilst the song was still being sung.

,, *The song.*—Mark the use of the definite article *the.* This article indicates that the song in the midst of which he rose abruptly was the song being sung.

,, *Beyond the sound of music.*—To a distance where he could not hear the music.

,, *The change*—In his habits and conduct.

Page.
32. *Renew.*—Revive, re-awaken.

" *Neglected.*—Gave no heed to; was unmoved by.

" *Their officiousness.*—Their intrusive efforts to re-awaken in him a desire for pleasures.

" *Repulsed.*—(L. *repello*, to drive back.) Refused.

" *Rivulets.*—(The diminutive of rivers; from the Latin *rivus* a stream.) Small streams.

" *Anon*—Soon after, at another time.

" *Pastures.*—(L. *pasco*, to feed.) Meadows kept for feeding cattle.

" *Biting the herbage.*—Eating the grass.

" *Singularity.*—Conduct unlike that of others.

" *Humour.*—Mood, fancies.

" *Made him much observed.*—Caused many people to notice him.

" *Disquiet.*—Mental unrest.

" *Browsing.*—Feeding.

" *Animal creation*—The animals.

" *Strays.*—Wanders about.

" *Beside me*—By my side, in my neighbourhood.

" *Corporal.*—(L. *corpus*, body.) Bodily.

" *Necessities.*—Wants.

" *Crops*—Bites.

" *The stream.*—The water of the stream. (Synecdoche.)

" *Appeased.*—(Fr. *appaiser* from, *à* to, and *paix* peace, to bring to peace, to quiet.) Allayed, satisfied.

" *Is at rest.*—(This does not mean that the animal goes to sleep, but that it is no longer uneasy as it is when it is hungry or thirsty.) Has no disturbing thoughts.

" *I am pained with want.*—I suffer the same pain or uneasiness when I am in want of food or drink.

" *With fulness*—When I am full.

Page
32. *The intermediate hours* —(L. *inter* between and *me dius* middle.) The hours between one meal and the next.

,, *Tedious.*—Long and weary.

,, *Quicken the attention.*—Something to attend to; something to concern myself about.

,, *Berries of the corn.*—Grains of corn.

,, *Securing.*—(Adjective, qualifying "happiness.")

,, *Tuning.*—Singing.

,, *One unvaried series,' &c.*—The reference is to the fact that birds never change their notes. They have certain notes or sounds which they sing or whistle, and they never give forth anything new. The best of them run up and down certain notes (like the nightingale), and one fancies as if they were only by this means preparing (tuning) their throats for various melodies; but they never go beyond those particular notes. Yet they are not wearied of the sameness.

,, *The lutonist.*—The person who plays on the lute.

,, *Weary.*—(Verb, having for its subject "sounds.") Make weary.

,, *Wearisome.*—Giving weariness.

,, *Power of perception.*— Power of perceiving, or gaining knowledge of outward things by the senses. (Thus, the sense of smelling enables us to perceive odours; the sense of seeing, to perceive the beauties of nature; the sense of hearing, to receive pleasure from music. and so on.) By "no power of perception," is meant no bodily sense.

,, *Glutted.*—(To "glut" properly, means to swallow. Then its comes to mean to satisfy with more than is sufficient.) Satisfied to loathing.

,, *Its proper pleasure.*— The proper pleasure of the sense; that is to say, the pleasure that is perceived by the sense. (Thus, music is the proper pleasure of the sense of hearing, because it is by this sense that pleasure is derived from music;

beauty is the proper pleasure of the sense of seeing, and so on.)

32. *Latent.*—Hidden.

,, *This place*—The Happy Valley.

., *Affords no gratification*—Provides no pleasure.

,, *Desire distinct from sense*—Desires other than those connected with the bodily senses. ...

.,, *That walk.*—Parse "that" as a relative pronoun equivalent to "who," having for its antecedent "me."

,, *Burdened with myself.*—Rasselas speaks of himself as being a burden to himself, because he took about with him wherever he went a feeling of unrest, weariness, and dissatisfaction, which was burdensome to him.

33. *Felicity*—Happiness.

,, *I fear pain.*—I fear that pain will come; I anticipate pain.

., *Do not feel it.*—Am not actually feeling it.

,, *Shrink at.*—Shrink from the memory of past evils.

,, *Start at.*—Suddenly frightened with the thought of.

., *Anticipated.*—Expected.

,. *The equity.*—(L. *æquus,* equal.) Fairness, justice.

,, *Providence.*—God, who is sometimes spoken of as Providence, because He is the great Provider

.,, *Has balanced.*—Has made equal in weight the sufferings and the enjoyments.

,, *Peculiar.*—(L. *peculium,* one's own property. This Latin word is again derived from *pecus* cattle, and takes us back to the time when a man's wealth consisted in the cattle he owned The word "peculiar" means, what is distinctively one's own. Hence) Special, unusually great. (Rasselas' idea was, that as he being a man was capable of higher enjoyments than the lower animals, so God has arranged that he should also be capable of greater

Page.

sufferings. The greater power of enjoyment was counter-balanced by the greater power of suffering.

33. *Plaintive voice* —Low, complaining voice.

,, *Discovered him to feel.*—Showed him to feel ; showed or proved that he felt.

,, *Complacence.* —Satisfaction, pleasure.

,, *Perspicacity*—(L. *perspicio* to see through) Keenness of sight, keenness of discernment.

Although, judging from the tone of his voice, one would have inferred that the prince was suffering some distress of mind, yet, judging from the expression of his face, it was evident that he was pleased at the thought that he was so clever in finding out what the other people in the valley had not found out, viz , that man had a want which no pleasures of sense could satisfy.

,, *Solace of* —Comfort from.

,, *The delicacy with which he felt*—The miseries of life. His quickness to feel the miseries of life.

,, *Bewailed them* —Lamented or mourned over the miseries of life.

From his miseries the prince got at least the comfort of knowing that he was a person of very fine feelings, and had the power to describe those feelings in eloquent language.

,, *Mingled in.*—Joined others in.

,, *Diversions.*—(i . *di* from and *verto* to turn, to turn away from. Anything that makes one turn from one thought or occupation to another, is a diversion. Hence) Amusements.

,, *Was lightened* —Was relieved of whatever burden he seemed to have.

THE WANTS OF HIM THAT WANTS NOTHING.

33. *That he* —That the instructor.

,, *His disease of mind* —The prince's disease of mind ; the cause of his mental suffering.

33. *Counsel.*—Advice.

  ,,   *Officiously.*—Over-zealously.

  ,,   *Conference.*—(L. *con* with and *fero* to carry, to show or declare.) Conversation in which one person conveys or declares his thoughts or reasons to another.

  ,,   *Which*—Has for its antecedent "opportunity."

  ,,   *Intellects.*—Powers of intellect or understanding.

  ,,   *Exhausted.*—Used up.

  ,,   *To afford.*—To give.

  ,,   *Intrude.*—Thrust himself unbidden.

  ,,   *Lectures*—The lessons which the old instructor had given.

  ,,   *And to become,* &c.—And which I must first entirely forget before I e n be interested in them again in the same way as when they were new.

  ,,   *Composed himself to.*—Quieted down his mind to; settle t himself to. (L. *con* with and *pono* to place. Bringing one's thoughts together again after they have been scattered or disturbed.)

  ,,   *Settled*—Fixed, definite.

  ,,   *His pursuer.*—His old instructor who was pursuing him, *i e.*, going after him in order to enter into conversation with him.

  ,,   *Prompted*—Urged.

  ,,   *Once.*—At one time, formerly.

  ,,   *Reverenced.*—Regarded with love mingled with fear.

  ,,   *And still loved*—The idea is, that although the prince still loved the old man, he had lost that belief in his superior wisdom and that fear of his authority as an instructor which he had had before he began to think for himself.

  ,,   *Thus encouraged.*—The encouragement consisted in being invited to sit down by the side of the prince.

Page.

33. *To cloud, &c.*—(Metaphor.) To allow my presence
to prevent the others from enjoying their pleasures,
just as a cloud coming between us and the sun
prevents the sun's light from falling on us. (Parse
"to cloud," as a verb in the infinitive mood.)

,, *Who have complained.*—(Parse "have complained"
as in the second person, agreeing with its nomina-
tive "who," which agrees in person with "you,"
which is supposed to be its antecedent. Properly,
however, "who" agrees with the antecedent "per-
son" understood after "first," and is in the third
person, and ought to have the verb in the third
person : thus, "You are the first [person] who has
complained.")

,, *Real.*—Actual. (In opposition to imaginary.)

,, *Of all.*—Of all that.

,, *Here is.*—Here (in the valley) there is.

34. *All that labour, &c.*—The reference is to the pleasures
and luxuries which the princes enjoyed in the
Happy Valley. The music, for example, which
charmed them, cost them nothing. They enjoyed
the pleasure that was to be derived from listening
to it, but the labour necessary to acquire the art
of playing on the various instruments that gave
forth the music, had been endured by others. The
rich and rare delicacies, for example, which were
placed as food upon the table, cost the princes no
danger to obtain ; but they had been obtained for
them by other people who had incurred various
dangers in getting them.

,, *Is without supply.*—Is not supplied.

,, *If you want nothing.*—If there is nothing you desire,
which is not supplied.

,, *How are you unhappy ?*—In what way can you say
that you are unhappy ?

,, *Is the cause.*—(The subject of the verb "is" is the
subject-sentence, "that I want nothing." As also
the subject-sentence "or that I know not what I

Page.

    want," which is separated from the first subject-sentence by the disjunctive particle " or."

34. *Any known want.*—(Parse " known " as a participial adjective, qualifying " want.") Any want which I could recognize as such.

,, *A certain wish.*—A definite wish; that is, I would know what exactly to wish for.

,, *Would excite endeavour*—Would urge me to make an effort to get what I wanted.

,, *Repine.*—Regret.

,, *To see the sun, &c.*—To have the days hang so heavily on my hands; to find time move on so slowly. (The sun moving to the west would mark the measure of the day.)

,, *Sleep will no longer, &c.*—I can no longer forget my miseries in sleep.

,, *To pursue.*—Something to seek after; something to acquire.

,, *The latter.*—Each succeeding hour is more wearisome than the one that preceded it.

    Rasselas was really suffering for want of something to occupy his mind and his energies.

,, *Let your experience inform me.*—Tell me from your experience.

,, *How the day may now seem.*—How I may make the day seem.

,, *While.*—When, *i. e.*, in my childhood.

,, *Fresh.*—Seemed full of interest, and new.

,, *Every moment showed me.*—And I gained some new knowledge every moment.

,, *Enjoyed too much.*—Had too much in the way of enjoyment.

,, *To desire.*—To seek to obtain.

,, *Species of affliction.*—Kind of disease.

,, *The world.*—The people outside the Happy Valley.

Page.

34. *Your present state.*—This does not mean the prince's then state of mind, but the comfort and luxury in which He was living.

„ *Long.*—Eagerly desire.

„ *Since the sight of them, &c.*—Since it is necessary to see the miseries of others in order to value the comforts and enjoyments which one has.

THE PRINCE CONTINUES TO GRIEVE AND MUSE

34. *Muse.*—Meditate.

„ *Proclaimed, &c.*—Gave notice that it was time for a meal.

„ *Produced the only conclusion, &c.*—Had made the prince wish for the very thing which the old man wanted to prevent him from wishing for.

„ *Decline of life.*—Old age.

„ *Of short duration*—Do not last long.

„ *Whether it be that.*—Whether the fact that old people do not feel either shame or grief long is owing to the circumstance that, &c.

„ *Regarded*—Thought of.

„ *Is about to put an end.*—Will soon put an end (owing to old age being already upon us).

„ *A wider space.*—The world outside, which was much larger than the valley.

„ *Emotions.*—Excited feelings.

„ *Terrified, &c.*—Frightened at the thought that there were so many more years for him to live.

„ *Which nature promised him.*—Which must go on living in the natural course of things.

„ *In a long time.*—In a long life. (A long life meant a long time of suffering.)

„ *Now.*—Now that he had something to desire, viz., to see the outside world. (Before he had this object in view, he was sorry at the thought that being a

young man, he had so many years to live yet : but now, with an object to attain, he was glad that he had many years of life before him.

34. *Beam.*—Rays.   (Metaphor.)

35. *Darted.*—Thrown like a sunbeam, or a dart.

,, *Rekindle youth, &c.*—(To rekindle is to kindle again, to light again anything in which the fire that had been burning has gone out " To re-kindle youth " is a metaphor in which youth is likened to a flame which lights up the face.) Made his face look young again.

,, *Lustre.*—Brightness.

,, *Fired.*—Excited, greatly moved.

,, *Either end or means.*—Either what he should set himself to accomplish (end), or by what means he should accomplish it.

,, *The secret stock, &c.*—He was happy in the prospect of going out into the world and enlarging his experiences ; but he did not speak of this purpose to any one.

,, *Affected.*—Pretended.

,, *Schemes of diversion.*—Plans for providing amusement.

,, *With the state.*—With the condition of life.

,, *But pleasure, &c*—However numerous the pleasures may be, and however they may be prolonged, they cannot fill up the whole of a man's life ; there must still remain a good deal of time that is not spent in pleasures,

,, *Without suspicion.*—Without being suspected by others.

,, *He supposed, &c.*—He thought that if he mixed frequently among the people of the valley, they would not suspect his intention to make his escape out of the valley.

,, *He retired gladly to privacy.*—He was glad to be alone.

(24)

85. *A subject of thought.*—Something to think about.

,, *To picture to himself.*—To fancy.

,, *To be entangled, &c*—To fancy himself in difficulties of various kinds. (To be entangled is to be caught in a twist or tangle. To be entangled in difficulties, is to be in difficulties.)

,, *Wild.*—Imprudent, rash.

,, *Adventures.*—Undertakings that are associated with risk or danger.

,, *His benevolence, &c*—Being of a benevolent disposition, that is, of a disposition kind-hearted and full of a desire to help his fellow-men, he used to imagine that by everything he undertook (projects), he succeeded in either delivering men from distress, or finding out some fraud or cheating that had been going on, or stopping wicked people from ill-treating (oppression) others, or making many people happy.

,, *Diffusion*—Spreading. . (L. *dis* and *fundo* to pour ; to spread)

,, *Passed.*—(Intransitive verb, having for its subject " months.")

,, *Visionary bustle.*—Imaginary business and excite ment.

,, *Preparations.*—These preparations were all mental ; that is, in his imagination.

,, *Incidents of human affairs.*—Events that happen among men outside.

,, *By what means he should, &c.*—How he was to make his escape from the valley, was to get in among the men outside.

,, *Feigned to himself.*—Imagined to himself.

,, *Portion.*—Property, money.

,, *Crying after him, &c*—Entreating him to restore or give back what he (the lover) had taken.

,, *The image.*—The picture, the imaginary scorn of the maiden and her deceitful lover.

35. • *With all the eagerness, &c* —As eagerly as if what
he imagined was actually taking place, and he was
really pursuing the man who had robbed the girl.

" *Fear naturally quickens the flight of guilt.*—(In this
sentence we have another instance of what is a
very noticeable feature of Dr. Johnson's style—
the substitution of the abstract for the concrete.
"Guilt" is here used for a guilty person, just as,
in the concluding sentence of the last paragraph
but one on this page, " distress " means people in
distress, " fraud " means the perpetrators of fraud,
"oppression" people who oppress others) When
a man is guilty, fear makes him try to escape
quickly.

" *The fugitive.*—(L. *fugio,* to run away, to flee.)   The
person running away, (*i.e.*) the treacherous lover.

" *To weary by perseverance,* &c.—As he could not run
fast enough to overtake the fugitive, he made up
his mind to keep running long enough to tire out
the fugitive, and so seize him at last.   -

" • *Surpass.*—Go beyond.

" *Pressed on.*—Kept running on.

" *The foot of the mountain* —The base of the moun-
tain.

" *Stopped his course.*—(" Course" from the Latin *curro*
to run.)   Prevented him from running any further.

" *Recollected himself.*—(L. *recolligo,* to collect again.
Hence to recollect is to call back a thought to the
memory.)   Remembered that which was exciting
him was only imaginary and not real.

" *Fatal* —(L. *for, fari,* to speak. " Fate" is that which
is spoken ; and as anything that God speaks is
supposed to be final and irreversible, "fate" comes
to mean that which is inevitable, that which
cannot be removed or turned aside—destiny.)   A
"fatal obstacle " is an obstacle or hindrance which
cannot be overcome.

Page.

35. *Hinders, &c.*—The mountain barrier all round the valley prevented the prince from enjoying the pleasures of the outside world, and from doing all the good and brave things (virtue) which he had been imagining to himself.

,, *How long.*—For how long a time.

,, *My hopes, &c.*—I have hoped and wished to get out of the valley.

,, *This boundary, &c.*—These mountains which bound or confine me to spending my whole life in this valley.

,, *Yet.*—Notwithstanding.

,, *Surmount.*—Mount over, overcome.

,, *Reflection*—Thought.

36. *The sun, &c.*—Two years had passed.

,, *Never been acquainted.*—Never felt.

,, *Left.*—Had left. (Has for its nominative "which.")

,, *Nothing real behind*—Nothing actually accomplished.

,, *Compared twenty months, &c.*—Considered what proportion twenty months bore to the whole period of the life of a man.

,, *Is not to be counted.*—(Agrees, respectively with its subjects ignorance and imbecility. It is in the singular number, because it has for its nominative each of these nouns separately, they being separated from one another by the disjunctive particle "or.")

,, *Infancy.*—Age. (Another instance of the use of the abstract for the concrete.) Infants—old people.

,, *Ignorance of infancy, &c.*—(An instance of the antithesis so characteristic of Dr. Johnson's writings.) The period of infancy, when we know nothing, and the period of old age when we have lost the power of doing anything from failure of intellect.

36. *Mused away.*—Wasted in mere musing. (The adverb "away" denotes distance from, when following a verb. In this sense we use such phrases as "put away," "run away," "give away." So to muse away time, is to keep musing until the time has gone to a distance.

,, *Was certain.*—Was in actual ¦

,, *Of twenty months to come,* &c.—Who can make it certain for me that I shall live another twenty months.

,, *The consciousness,* &c.—He felt very keenly the folly he had committed.

,, *He reconciled to himself.*—The idea is that his own thoughts were accusing him, and it was long before they ceased to do so.

,, *The rest of my time.*—The time before the twenty months.

,, *The absurd institutions of my country.*—The foolish rules and practices that prevail in my country. (The institution particularly referred to, was the keeping up of this Happy Valley.

,, *Remorse.*—Self-accusation. (The Prince had not been personally responsible for the way in which his earlier years had been spent)

,, *Since new life,* &c.—Since new thoughts and desires have sprung up in my mind.

,, *Reasonable felicity.*—The happiness he hoped to work out for himself by his own wise and noble and generous actions.

,, *Squandered.*—Wasted.

,, *Gazer.*—Noun in apposition to "I." I an idle gazer have been.

,, *In this time.*—During this time.

,, *Committed themselves.*—Gone to the woods to make nests for themselves and learn to fly in the air.

Page.

56. *Kid.*—(The singular number is used generically.) Kids.

Has forsaken the tent.—Has become independent of the mother.

Quest.—(L. *quœro,* to seek.) Search.

Independent sustenance.—Food obtained independently of the mother.

Advances.—(This word is sometimes used to denote sums of money paid beforehand. Here it means) Stages of progress towards the attainment of an end.

Flux.—(L. *fluo* to flow.) The flowing or passing away.

Upbraided.—Rebuked.

Inactivity.—(L. *ago* to do.) The state of doing nothing.

Intellectual business.—Knowledge, that may be good in itself, but which cannot be turned to any practical account.

The examples of the earth.—The examples shown by the earth (The reference is to the birds, the kids, the trees, &c., on the earth which have all made progress in their several ways.)

The instructions of the planets.—(Gr. *planao* to wander. Planets are the stars that *move* in orbits round their central suns. Thus Mercury, Mars, Venus, Jupiter, Saturn, Uranus, are planets which, along with our earth, move in regular periods round our sun. They are called planets in contradistinction to the *fixed* stars.) The planets here referred to are the earth, and the moon which revolves round it. By the earth's motion round the sun we mark our year, and by the moon's revolution round the earth we mark our month. By "the instructions of the planets" is therefore meant, the lesson that the earth and moon are constantly teaching us, that time is passing away.

Page.

36. *Restore.*—Bring back.

,, *Fastened* on his mind.—(Parse " fastened " as an in-transitive verb. Like an intransitive verb it has the force of a middle voice in which the action issuing therefrom reverts to the agent. " Fastened" is therefore equivalent to " fastened itself.") Clung to his mind.

,, *Exertion* —Effort.

,, *Repaired.*—Mended.

,, *What cannot be repaired, etc.*—The idea is the same as that conveyed in the common English adage, it is of no use to cry over spilt milk.

,, *Her.*—(Mind is supposed to be of the feminine gender.)

,, *Ardour* —(L *ardeo*, to burn: heat: hence) Eagerness.

,, *Distant views* —The consideration of subjects that have no connection with surrounding things.

,, *Regreted his regret.*—Was sorry that he had wasted so much time in feeling sorry.

,, *Bent his whole mind upon* —Directed his whole mind to. (We say, " a man is bent upon doing a thing," when we mean that he is resolved on doing it.)

THE PRINCE MEDITATES HIS ESCAPE.

37. *Meditates.*—(This verb is sometimes used transitively as here, and sometimes with the preposition " on ;" as, for example, " he was meditating on the good qualities of his friend." When the subject of meditation is an action to be performed by the person himself, the verb is used without the pronoun; as, " the king was meditating evil," that is, he was meditating to do evil. " The prince meditates escape," that is, he meditates to make his escape.

,, *Effected.*—To be effected, or accomplished.

Page.

37. *The bars of nature.*—The surrounding mountains which were natural barriers.

,, *Which had never, &c.*—("Which" has for its antecedent "bars.") No one had ever made his escape across the mountains.

,, *Passed it.*—Passed through it on the way into the valley.

,, *Grate.*—Iron cage.

,, *Aperture.*—Opening.

,, *Might conceal.*—Possibly concealed.

,, *Inaccessible.*—Not to be reached.

,, *Prominence*—(L. *pro* and *minor* to threaten, that is, to shoot forward. Anything that shoots up from a lower surface is a prominence.) Height.

,, *With all the power of art.*—By very skilful machinery.

,, *Successive sentinel.*—("Sentinel" from the L. *sentio* to perceive. One who is placed so as to perceive or observe the approach of danger: a soldier appointed to mount guard.) Sentinels relieving one another, so that the gate was never left unguarded.

,, *Was by its position, &c.*—Was so placed as to be always seen by the people living in the valley.

,, *Were discharged.*—Were carried out to the other side of the mountains.

,, *Solid bulk.*—A solid body of any size, such as the body of a man.

,, *Dejected.*—Cast down.

,, *Resolved.*—He resolved. (The pronoun ought to have been repeated after the disjunctive particle "but."

,, *Researches.*—Searchings for a place from where he could make his escape.

,, *New hope.*—Fresh hope of finding a suitable place.

Page.

37. *Applauded.*—Praised.

„ *Sound.*—(Adverb.) Soundly.

„ *Amusements.*—Things that amused him.

„ *Beguiled his labour.*—Deceived him into not feeling fatigue from his labour.

„ *Diversified his thoughts.*—Turned his thoughts to different subjects.

„ *Discerned.*—Found out, noticed.

„ *Properties.*—Qualities.

„ *Replete.*—Full.

„ *Of which, &c.*—With the contemplation (study) of which he made up his mind that he would comfort himself.

„ *Accomplish his flight.*—Make his escape.

„ *Yet.*—Up to this time.

„ *A source, &c.*—Innumerable things to study ("Inexhaustible inquiry" is inquiry that cannot be exhausted or used up; that is, inquiry that is never finished, because the things to be inquired about never come to an end.

„ *Original curiosity.*—The original or first object with which he began to search; that is, his curiosity or desire to find out some way of escape. Whilst looking for this he had come to find out a great many other interesting things; but in thinking of and studying these interesting things, he did not forget the object with which he first began his researches.

„ *To survey.*—To look up; to examine.

„ *The walls of his prison.*—The mountains which were like the walls around the Happy Valley which was his prison.

„ *Spared to search.*—Gave up searching.

„ *New toils.*—Fresh labour.

Page.
37. *Interstices.*—(L. *inter* between and *sto* to stand. The
narrow space between two things.) Openings in
the mountains.

„ *Design.*--Purpose of escaping.

„ *Expedient.*—Means.

„ *That time should offer.*—That might at any time
present itself.

A DISSERTATION ON THE ART OF FLYING.

38. *Artists* —(In modern usage, an artist is a person who
practises the liberal arts, and brings science and
taste to bear upon his work. In this sense, paint-
ers, musicians, sculptors, engravers and architects
are artists. But in the text, the word is used in
the general sense of those who practice any art.)

„ *Allured.*—Enticed

„ *Accommodation.*—Convenience.

„ *Eminent.*—Held in high esteem.

„ *Engines.*—Machines.

„ *Recreation* —Amusements.

„ *Pavilion.*—A summer-house.

„ *Artificial.*—(The opposite of artificial is natural)

„ *Appropriated.*—Set apart for.

„ *Was ventilated.*—(*Ventus,* the wind.) Had the air
kept in motion.

„ *To which the rivulets &c.*—The water of the rivulets
as it flowed, moved certain wheels by which the
fans were moved.

„ *Of which some.*—Some of which.

„ *Impulse of the wind.*—(L. *impello,* to drive against.)
The wind striking against them.

„ *By the power of the stream.*—By the force of the
water as it flowed.

Page.
38. *Acquisitions.*—The different kinds of knowledge he acquired.

,, *The open world*—The world outside the valley.

,, *A sailing chariot.*—A carriage to be moved by sails

,, *Upon a level surface.*—Upon ground that was level, that is, that had no ups and downs in it.

,, *Solicited its completion*—Begged that he would finish it.

,, *Regarded.*—(This verb, from the French *regarder*, to look at, is often used in the sense of looking at, here, however, it means) Esteemed, highly thought of.

,, *Higher honors.*—Honors higher than those he had already gained by means of things he had already made.

,, *Mechanic.*—(Adj.) Mechanical. The "mechanical sciences" are the sciences that relate to the constructing or making of things.

,, *Tardy conveyance.*—The slow way of conveying or carrying persons

,, *Migration.*—Movement from one place to another

,, *The fields of air.*—The broad expanse of air.

,, *Ignorance and idleness.*—Ignorant and idle people.

,, *Crawl upon the ground.*—Move slowly along the ground.

,, *Passing.*—Going beyond.

,, *Resolved.*—Should be, "he resolved."

,, *Hope to afflict him with disappointment.*—There must first have been a hope before there can be a disappointment. When there has been no hope, there can be no disappointment afterwards. Hence if a man does not want to suffer the pain of disappointment, he had better not indulge in hope. Rasselas did not want to allow (suffer) himself to indulge a hope which might afterwards end in disappointment.

Page.

38. *Prevails over.*—Is greater than.

,, *Your imagination.*—You imagine you can do more than you are actually able to do.

,, *Element.*—(In popular language, fire, air, earth and water are spoken of as the four elements. This is the sense in which the word is used here.)

,, *By nature.*—Naturally, without being taught.

,, *By art.*—By practice

,, *A grosser fluid.*—Water, which is thicker (grosser) than air.

,, *Subtler.*—Thinner. (The air)

,, *To proportion.*—(Verb in the infinitive mood.) To adjust, to adapt.

,, *The different density of matter.*—Air and water being substances that differ in density (the thickness) from one another, the power to resist the air must be greater than that required to resist water.

39. *Upborne.*—Borne up.

,, *Renew.*—Repeat.

,, *Impulse.*—Stroke.

,, *Recede.*—Go back from.

, *Pressure.*—The pressure in the air or water caused by the impulse or stroke.

,, *Violent.*—Severe.

,, *Domestic.*—Reared and kept in the house.

,, *Attraction.*—The attraction of gravity.

,, *Gravity.*—Weight. (It is the attraction of gravity that gives bodies their weight.)

,, *Region.*—A height in the air.

,, *Without any tendency to fall.*—Beyond the reach of the attraction of gravity.

,, *No care.*—To prevent falling.

,, *But.*—Except.

length and connected by a thin skin ; and it is this peculiarity that enables the bat to compress its wing in folds.

39. *Accommodated to.*—Adapted; made so as to suit.

,, *This model.*—This pattern, *viz.*, the form of the bat's wing

,, *My task.*—The work I have set myself of constructing wings.

,, *Expect.*—I expect

,, *Tower.*—Rise high.

,, *Beyond the malice, &c.*—Beyond the reach of men who may want to do me harm, and who may be pursuing me for that purpose.

,, *The art.*—The secret of how to make the wings.

,, *Divulged.*—(*di* and *vulgo*) To make public

,, *Envy.*—Be unwilling that others should enjoy.

,, *Advantage.*—The advantage of rising into the air.

,, *For universal good.*—For the good of all men.

40. *Alacrity.*—Readiness, quickness.

,, *What would be the security of the good.*—How would good people be safe from the injuries which people seek to do them.

,, *Invade them from the sky.*—Fly through the air and come down suddenly upon the place where the good may be living. (L. *in* and *vado* to go ; to go into.) To attack.

,, *Afforded security.*—Gave protection.

,, *A flight.*—A great multitude flying in the air. (The word is commonly used with reference to the swarms of locusts that sometimes make their appearance in the air: such a body of locusts is called a flight of locusts.) And so a large body of savages flying along through the air, is here spoken of as a flight of savages. Addison uses the phrase, "great flights of birds."

Page.

40. *Northern Savages* —The uncivilized men of the north. (This tale of Rasselas is supposed to describe very early times, before the nations of Europe had been civilized and when Europe was still occupied by wild hordes.

„ *Hover.*—Move about around one place.

„ *The capital.*—The chief city (from L. *caput* the head.)

„ *Vast region.* —Large country.

„ *Fall upon.*—When an army attacks another suddenly and with great force, it is said to "fall upon" it. The phrase is metaphorical. But in the case supposed in the text, it would be a literal falling of an attacking army from the air.

„ *Violated.*—Forcibly entered.

„ *The naked nations.*—Savages; so called, because savages go about for the most part without clothing.

„ *Swarm.*—Live in great numbers.

„ *Promised secrecy.*—Promised to keep the matter a secret.

„ *The performance.*—The making of the wings.

„ *Not wholly hopeless.*—(This is an instance of a double negative being equivalent to a positive. "Not" and "hopeless" are the two negatives, and they are equivalent to hopeful.

„ *Ingenious.*—(L. *ingenium*, mind, understanding.) Clever. (Do not confound "ingenious" with "ingenuous," which means, frank, candid.

„ *Contrivances.*—Things planned and made for any given purpose.

„ *Facilitate motion.*—(L. *facilis*, easy.) Make it easy to move, *i. e*, to fly.

„ *Levity.*—(L. *levis*, light, not heavy) The word is generally used in its secondary or metaphoric sense and denotes lightness of character, want of seri

ousness.   In scientific language it retains its
primary meaning—absence of weight.

40.   *Unite, &c.*—Make the wings so that they should be
light, and yet strong.

„   *Vultures and eagles behind him.*—Fly faster than
vultures and eagles.

„   *The contagion of his confidence.*—(This word, like
"contact," comes from the Latin words *con* and
tango to touch, and means the touching together
of two things.   It is, however, entirely used to
signify the communication of disease or any other
influence by contact or touching.   A disease is
said to be contagious, when a person is likely to
get it, who touches another person suffering from
it.   Hence it is used to describe anything that is
catching, whether good or bad.   Thus we say,
laughter is contagious, when we mean that when
one person laughs, other people, seeing him, laugh
also.   So with qualities of the mind such as fear
and courage, hope and despondency, cheerfulness
and gloom.   When one man is hopeful, others by
contact with him become hopeful, and so on.   So
in the text, "the contagion of his confidence
seized upon the prince," means that the prince see-
ing how confident the artist was of succeeding,
himself also became confident that he would suc-
ceed.

„   *Appeared.*—Made his appearance.

„   *Furnished for flight.*—With every thing provided for
a journey through the air.

„   *Promontory.*—A high projection of land in rock.

„   *Waved his pinions.*—Opened his wings and moved
them up and down.

„   *To gather air.*—To increase the quantity of air under
the wing so as to furnish proper resistance.

„   *Stand.*—(Noun.)   The place where he was standing.

„   *Sustained him.*—Kept him up.

THE PRINCE FINDS A MAN OF LEARNING.

40. *Afflicted.*—Grieved in mind.

,, *Disaster*—(From *dis* and *aster* a star. A disaster is properly a stroke from an unfavorable planet. Hence) Misfortune.

.. *A happier event.*—A more successful result. The prince hoped that the artist would succeed, because he could not at the time think of any other way of escaping from the valley.

,, *At a stand.*—Not moving; not acting. (He could not imagine or think of any other way of escaping.

,, *Into the world.*—Into the world outside the valley.

.. *Support himself*—Encourage his own mind to think that he would yet succeed in escaping.

.. *Discontent preyed upon him.*—(To prey, is to feed upon. Discontent fed upon him, that is, devoured his mind. In other words) He became more and more discontented.

;, *Lose his thoughts in sadness.*—He was so overcome by sadness, that he could not think on other subjects as he used to do.

,, *The clouds broke, &c.*—The clouds as they moved along struck against the mountains and immediately emptied themselves in rain which poured down the sides of the mountains into the valley below.

,, *Discharge.*—Carry out.

,, *The level.*—The flat plain.

41. *Inundation.*—(L. *in* and *unda* a wave.) The flowing in of water; the flood.

,, *The eye.*—(Synecdoche.) A person.

,, *Discover.*—To see.

,, *The tame*—Beasts, understood.

,, *Retreated, &c.*—Went away into the mountains, because the ground was high and the inundation could not reach them there.

Page
11. *Confined, &c.*—The princes could not go out of the
house, so they had to amuse themselves with the
amusements that could be had within doors.

,. *Imlac.*—Imlac was the poet.

,, *To attend him.*—To come to him.

,, *A man.*—Imlac,

,, *Paint.*—(Metaphor.) Describe.

., *Common.*—Well known.

., *Mortals.*—(L. *mors*, death ; liable to die) Men.

, *Had kept him a stranger* —Had prevented him from
knowing anything about them.

, *Curiosity.*—His eager desire for knowledge.

., *Novelty.*--New information.

, *Regretted the necessity of sleep.*—Was sorry that he
"was obliged to go to sleep.

.. *Induced.*—(L, *in* and *duco* to lead.) He was induced.

., *Close.*—End.

, *Concert.*—A musical entertainment.

,, *Obliged.*— Was obliged.

,, *Restrain.*—Keep back.

SMOLLET.

Tobias Smollet, an eminent English novelist, was born in Scot-
land in 1721. He was educated for a surgeon, and served on board
a ship at the bombardment of Carthagena. He afterwards quitted
the service, and took his degree of Doctor of Physic ; but meeting with
no success in that line, he became a writer by profession.

His first works were "Roderick Random," "Regicide," "Pere-
grine Pickle," and "Adventures of Ferdinand Count Fathom."

For an article in the "Critical Review" which he conducted for
some time, he was prosecuted by Admiral Knowles, and confined
in the King's Bench Prison, where he wrote the "Adventures of
Sir Lancelot Greaves."

In 1757, he published his "History of England," and in 1762
began a periodical paper called "The Britons." In 1763 he went
abroad, and in 1766, published an account of his travels. In 1771
appeared his novel "Humphrey Clinker."

. He also wrote some poems, compiled a Collection of Voyages and Travels, and translated " Gil Blas " and " Don Quixote " into English.

He died near Leghorn, in 1771.

Page.

49. *The Highlanders.*—The descendants of the ancient Celts, who inhabit the highlands or mountainous regions of Scotland.

,, *The eighteenth century*—The 18th century (100 years) extended from the year 1701 to the year 1800.

,, *Solitude.*—(L. *solus* alone.) . Loneliness.

,, *There is no want of people.*—There is no ___ of people, that is, there are many people.

,, *Credibly.*—(L. *credo* to believe.) In a manner that deserves belief, *i.e.,* on good authority.

,, *Duke of Argyll.*—Argyll is a country on the west coast of Scotland, and includes mainland and islands. The Lords of Argyll are Campbells, a family that dates as far back as the 12th century. The Dukes of Argyll are the hereditary chiefs of the clan known as the Campbells.

,, *The Duke of Argyll.*—The man who was Duke of Argyll at the time when Smollet was writing.

,, *Clan.*—A collection of families bearing the same surname, and united in their allegiance to one chieftain. The members of a clan are known by the surname of the chieftain.

,, *His own clan and surname.*—The Campbells.

,, *Surname.*—(Fr. *sur* above and *nom* a name.) An additional name.

50. *Appellation.*—(L. *appello* to call, to name.) Name.

,, *Breadalbane.*—A district of Scotland forming the western part of Perthshire.

,, *As numerous.*—As numerous as the Campbells.

,, *The M'Donalds, the Camerons, &c.*—These are the names of Highland clans. (There were two kinds

of clans : the clans of the borders and the clans of the highlands)

50. *Bring into the field*—Get ready, so as to bring into any war that may take place.

„   *Enterprise.*—Undertaking.

„   *We have liv 1 to see, &c*—The reference is to the time of Charles the Pretender, grandson of James II of England, who on landing in Scotland got the Scottish clans to espouse his cause.' With the forces that gathered round him, he advanced into England as far as Manchester : but when he heard that the royal army was advancing to meet him, he then returned to Scotland, where he was met by the English forces under Hawley at Falkirk, while another army under the Duke of Cumberland was advancing to meet him.

„   *Penetrated.*—Went as far as.

„   *Deliberation.*—Calmness, without any hurry.

„   *To cut off their retreat* —To come between them and the place (Scotland) to which they were wanting to return, so as to prevent them from getting back.

„   *Without the use, &c.*—Without having proper military weapons, and not knowing how to use them

„   *Regular forces.*—Trained and disciplined soldiers.

„   *Disciplined.*—Properly trained and accustomed to military obedience.

„   *Cannot fail of being.*—Cannot fail to be.

„   *The generality of mankind.*—Most men.

„   *Bounce.*—Spring from the ground.

„   *Lowlanders.*—People inhabiting the lowlands in contradistinction to the mountainous districts of Scotland.

„   *Agility.*—Quickness of movement.

50. *Incredibly abstemious*—So sparing in their food, that one would not believe how sparing they really are.

„   *Patient of, &c.*—(L *patior* to suffer, to endure.) Capable of bearing hunger and fatigue for a long time.

„   *Steeled*—(Steel is iron chemically prepared so as to be harder than plain iron. Hence to steel means to harden. A man is said to steel his mind against convictions, or to steel his heart against pity.) Hardened

„   *Plaid.*—A striped or variegated woolen cloth used as on over-garment in the Highlands of Scotland.

„   *Cope.*—(A cope is anything spread over the head.) The open sky.

„   *In quality of soldiers.*—In the capacity of soldiers; or, more simply, as soldiers.

„   *Invincible.*—(L *in* not and *vinco* to conquer.) The unconquerable

„   *Quick marches.*—(There is a reference here to a particular step among soldiers called the " quick march." This is distinguished from the " slow march," the one being a quick step and the other a slow one.) Rapid marches.

„   *A difficult country.*—A country in which the facilities for journeying by foot, such as good roads, &c , are absent.

„   *Strike sudden strokes.*—Make sudden attacks.

„   *To beat up an enemy's quarters.*—To attack an enemy suddenly in their encampment, when they are unprepared for fight.

„   *Harass, &c.*—Annoy their mounted soldiers. (" Cavalry " comes from *cheval*, the French word for a horse.)

„   *Perform expeditions.*—Undertake marches into an enemy's territory.

Page.
50. *Formality.*--The acting according to fixed form or rule.

„ *Without the formality of, &c.*--Without abiding by any fixed rule that an army undertaking a long journey ought to have such and such things to take along with it.

„ *Magazines.*—Supplies of powder and arms.

„ *Forage.*—Food for the cattle accompanying the army.

„ *Artillery.*—(This word, derived probably from *art*, and denoting any instrument made by the art or skill of man, was in old times employed to signify any weapons of war, such even as bows and arrows. The meaning is now entirely confined to) Heavy guns.

„ *A dangerous influence.*—An influence or power that might easily be used to overthrow the authority of the constituted Government.

„ *Operating.*—Being at work at, being felt at.

„ *The extremity of the island.*—The parts of Scotland most distant from the seat of Government, where therefore many things might be done without the knowledge of the Government.

„ *The eyes and hands of Government.*—The vigilance and executive authority of the Government.

„ *Precision.*—Exactness.

„ *To break the force.*--To destroy the power.

„ *Administration.*—Government. (The word is used without the article to denote the abstract idea, and not any particular administration.)

„ *Divide and conquer.*—This is a translation of a wellknown Latin adage, *Divide et impera.* The saying is descriptive of the old Roman policy from the earliest times, which consisted in so dividing the interests of the different tribes or peoples governed by Rome, as to prevent them from uniting together to resist her yoke. Being kept divided from one

another, they were weak, and Rome had no difficulty in maintaining her supremacy over them.

50. *The legislature.*—The Government in its legislative capacity.

,, *The legislature, &c.*—The disarmament of the Scotch clans was ordered in the reign of George I, and the Highland costume was prohibited in the reign of George II. This costume was again permitted, however, in the reign of George III.

,, *Their slavish tenures* —The members of these clans owed complete allegiance to their respective chiefs, were under engagement to obey them in all respects, and to take up arms when they required them to do so. The tenure on the principle on which they held (*L. teneo* to hold) land, was, therefore, that of slaves to their chiefs.

,, *Their slavish tenures are all dissolved by Act of Parliament.*—There was an Act passed in 1747 in the reign of George II, which abolished heritable jurisdictions in Scotland, and put an end to the legal authority of the chiefs of clans.

,, *The original attachment.*—The old attachment to the chiefs.

,, *Prior to.*—Older than.

,, *The feudal system.*—The essential difference between those Scottish clans and the feudal system. The word "clan" is a Gaelic word, and means the children or descendants of a common ancestor, and the members or families forming a clan were united together as descendants from a common ancestor whose name they bore, and whose lineal descendant they recognized as their chief It was a family system. But the feudal system, on the other hand, ("feudal" coming probably from the Teutonic *fee* wages, and *od* property, and thus signifying property given as wages for service,) was a system which made a grant of land or a holding on condition of military service. It was first intro

duced by Alexander Severus, and afterwards imitated
by the Lombards and other northern nations   It
came into full operation in England at the time of
the Norman conquest, when grants of land were made
to the Norman nobles on condition of their rendering military service, and they in their turn distributed these lands in small holdings on condition that
those who took them should render military service
whenever they were required to do so   The clanships represented a patriarchal system ; the feudal
system was a military vassalage.   The feudal system was abolished in England in the reign of
Charles II.

51.   *Pother.*—(The same as the common word "bother.")
Bustle, noisy confusion.

,,   *Copernican system.*—The system of astronomy taught
by Copernicus. (Copernicus was a Prussian astronomer whose theory that the earth and the other
planets revolved round the sun overthrew the Ptolemaic theory that the sun and the other planets
revolved round the earth.   He was born in 1473
and died in 1543.)

,,   *Policy.*—Measures adopted by the State for the government of a country.

,,   *Temperament.*—Disposition of mind.

,,   *This origin.*—The feudal system.

,,   *Constitution.*—Form of government.

,,   *For my part, &c.*—This sentence may be regarded as
an instance of the rhetorical figure known as
sarcasm.   The idea is that, if everything is to be
ascribed to the feudal system, then you may as
well ascribe trunk-hose and buttered ale to it too.

,,   *Trunk-hose.*—Large breeches formerly worn.

,,   *Patriarchal.*—(Gr. *patria*, a family, and *arches* a
chief.) A patriarch is the chief or head of a family.
The word is generally applied to men who, in the
the olden times, in Oriental countries, were the
recognized chiefs of families that had originally

sprung from their loins, and over whom they exercised sovereign authority. In this sense, the principle on which the clans were constituted was the patriarchal principle, as immediately after explained.

51. *Hereditary.*—(L. *hæres* an heir.) Descending from generation to generation.

,. *Ardour.*—Warmth.

,, *Filial.*—(L. *filius.* a son.) Belonging to a son.

,, *Paternal.*—(L. *pater* a father.) Belonging to a father.

,, *Would destroy.*—Should wish to destroy.

,, *James VI.*—James VI of Scotland was the same person as James I of England. He was the son of Mary Queen of Scots, and succeeded his mother on the throne of Scotland, and Queen Elizabeth on the throne of England. He became King of England in the year 1603.

,, *Laird*—A Scottish phrase for lord The chief of the clan.

,, *He was forfeited*—He was subjected to forfeit, that is to say, he forfeited or lost his estates, which were taken away from him on account of his cruelties.

,, *Campbell, Graham, Drummond.*—Campbell was the name of the Argyll family, whose head was the chief of the Campbell clan; Graham was the name of the Montrose family, whose head was the chief of the Graham clan; and Drummond was the name of the Perth family, whose head was the chief of the Drummond clan.

,, *Houses.*—Families.

,, *They still added, &c.*—They called themselves, some Campbell M'Gregors, others Graham M'Gregors, and others Drummond M'Gregors.

,, *Subsistence.*—Support.

(48)

Page.

51. *Mr. Cameron of Lochiel, &c.*—The chief of the clan of the Camerons, who took his name, Lochiel, from the estate.

,, *Attainted.*—(Fr. *atteindre*, to taint.) To attaint is to pronounce a man's blood tainted or corrupt, so that he forfeits his hereditary estates, and cannot transmit them to his heirs. This is a punishment which follows treason. A statute of Parliament attainting a criminal is called an act or bill of attainder.

,, *The last rebellion.*—The rebellion in favour of the young Pretender.

,, *Proclamation and Act of Parliament, &c.*—Several Scotch rebels were pardoned and permitted to return from France, whither they had escaped.

,, *Stocked his farm.*—Supplied his farm.

,, *Farm.*—A farm is a tract of land rented out to a man who cultivates it, and rears cattle upon it.

,, *Black cattle.*—Bulls, cows, and oxen are called black cattle, no matter what their colour may be.

,, *Wreck.*—Ruin, destruction.

,, *The fruits, &c*—The cattle and other things they gave him, which were a proof of their faithfulness to him and their love for him.

,, *This influence.*—The influence of a chief over his clan.

,, *Commonalty.*—The common people.

52 *Give them a taste of property and independence.*—Allow them to have property and to be independent.

,, *In vain, &c.*—The Government gives these members of the clans leases of land from among the estates that have been forfeited to the crown by the rebellion of the chiefs, so that they have to pay very little for their holdings; but what is the use of that when they have no means to improve the lands.

Pag.
52   *To prosecute* —To carry into effect

  ,,   *The means of improvement.*—Drains and other things by which the value of the land may be increased, and the lands be made more fertile.

  ,,   *Inexhaustible.*—That which cannot be exhausted or used up.

  ,   *Riches* —The fish and other things to be had in abundance in the sea.

  ,,   *Lines.*—Fishing lines.

  ,   *Tackle.* —Instruments, appliances

  .,   *From a real spirit.*—Urged by a real spirit.

  ,,   *Patriotism.*—(L. *patria*, one's own country.) Love of one's country.

  ,   *Linen.*—Cloth made of flax or hemp.

  .,   *Cod* —A kind of fish

  ,,   *Haul.*—Pull.

  .,   *Baited with mussels* —(Mussels are a small fish.) The hooks attached to the line had mussels fixed on them to serve as a bait, *i.e.* as the means by which to tempt fish to swallow the hook.

  ,   *Newfoundland.*—An island on the north east coast of North America, and celebrated for its cod fishery.

  .,   *Correspondent.*—Agent

  ,,   *Lisbon.*—The capital of Portugal.

  ,,•   *At his own price.*—At the price fixed by the man of whom the writer has been speaking.

  .,   *Was in a prosperous way.*—Prospered, was successful.

  ,,   *The late war.*—The Seven Years' War in Prussia in alliance with England, fought against Austria in alliance with France. It began in 1756 and was brought to a close by the Peace of Paris in 1763

  ,,   *Intervening.*—(L. *inter* between, and *venio* to come.) Coming between, happening meanwhile.

Page.

BURKE.

EDMUND BURKE, an illustrious writer and statesman, was born in Dublin in 1728, and received his education under Abraham Shackleton, a Quaker at Ballytore, near Carlow. His essay on the "Sublime and Beautiful" first brought him prominently into notice. In 1758 he suggested to Mr. Dodsley, the bookseller, the plan of the Annual Register, the historical part of which he wrote himself for many years. In 1761, he went to Ireland, and on his return was made Private Secretary to the Marquis of Rockingham, First Lord of the Treasury, who brought him into Parliament for Wendover in 1766. He was afterwards made member for Malton in Yorkshire, and introduced a bill for reform in the national expenditure, in which he was unsuccessful. In 1782 he obtained the post of Paymaster-General of the Forces, and a seat in the Privy Council, but on the death of his patron, the Marquis of Rockingham, he resigned his place. The principal acts of his political life were, the share he took in the impeachment of Warren Hastings, and the part against the beginners and defenders

of the French Revolution In 1790 he published his "Reflec-
tions on the Revolution in France," and also a number of pam-
phlets in support of positions he had taken up He died at Bea-
consfield in 1797.

98.   *American colonists.*—The first permanent English
settlement in America was made in the year 1607.
From that time numerous settlements began to be
formed, until a large portion of North America
became an English colony The English people
who then settled in America formed what is here
called the American colonists. They continued
under the government of the mother country till
the War of Independence broke out, which ended in
the acknowledgment in 1782 of the independence
of the United States It was with a view to pre
vent this war by persuading the British Govern
ment to conciliate the Americans and not to irritate
them by la   which they would resist, that Burke
made the speech from which this is an extract

.,   *The colonies*—The American colonies. (When a
number of people remove from their own country,
and go and settle permanently in another country,
remaining subject all the while to the laws of the
mother country, this new country is said to be a
colony of the old.)

,,   *Agriculture.*—(Noun in apposition to " another point
of view.") (L. *ager* a field, and *colo* to cultivate.)
The cultivation of land.

,,   *Prosecuted* —(L. *pro* and *sequor*, to follow.) Followed,
carried on.

,,   *Spirit.*—Energy

,,   *Multitude.*—Population

,,   *Besides.*—The prepositions *beside* and *besides* must
not be confounded with one another. *Beside* is
often used in the sense of by the side of, as, "Sit
beside me" It is also used to denote on one side
of, as, " He speaks beside the mark " But *besides*
never means anything but over and above, or in
addition to.

Page.

98. *Export.*—(L. *ex* out of and *porto* to carry.) Sending out of the country to a foreign market

,, *Grain.*—All kinds of grain.

,, *Comprehending.*—Including.

,, *A million*—Of pounds.

,, *The century.*—The 18th century.

,, *Imported.*—(L *im* or *in* and *porto* to carry) Brought into America.

,, *The mother country*—England.

,, *The Old World*—Europe.

,, *The New World*—America, so called because of its recent discovery.

,, *Scarcity*—Small amount of food.

,, *You have felt.*—You in England have felt.

,, *Desolating*—Depriving the land of its inhabitants.

,, *This child.*—America, which is supposed to be a child of England.

,, *Child of your old age.*—A child is said to be the child of one's old age, when his father happens to have been an old man at the time of the child's birth. England was an old country when America as a colony was born.

,, *Piety.*—Reverence.

,, *With Roman charity.*—The reference is to the legend about the old Roman who, having been left to starve in one of the dungeons of the Mamertine prison, was visited daily by his daughter who nourished him from her own breasts. America, the daughter, is supposed by her trade to feed the parent, England.

,, *Exuberance.*—(L. *ex* and *uber* a breast.) An overflowing, an abundance.

,, *Opened*—Explained.

,, *At your bar.*—(This was a speech before Parliament) In your presence, so that you might judge. (The word " bar " is used in the sense of a tribunal).

Page

98. *These acquisitions.*—The wealth aquired by means of these fisheries.

,, *Of value.*—To be of value.

,, *Excite your enry*—Make you envious of their wealth

,, *Enterprising.*—Bold, spirited.

,, *Exercised*—Carried on.

,, *Raised.*—Called forth.

,, *Sir*—In speaking in the House of Commons, every one addresses the "Speaker," who, as a sort of chairman, presides over the debates.

,, *The other parts*—The other parts of the country—America, where there are great fisheries

,, *New-England*—Forms the north-east portion of the United States and comprises the states of Vermont, New Hampshire, Massachusetts, Rhode Island and Connecticut.

,, *The whole fishery*-The business of catching whales for the sake of the oil, which is an important article of commerce.

,, *The tumbling mountains of ice.*—The ice-bergs in the Northern Seas, which are great masses of ice floating about on the water, move along with the currents and winds, and as they move about unsteadily, have the appearance of tumbling mountains.

,, *Deepest.*--Furthest.

,, *Frozen recesses.*—These bays are called recesses (L. *recedo* to retire) because the shore of the sea retires from its general line in order to form them. "Frozen," because the waters of those northern latitudes are exposed to a cold, which freezes them or turns them into ice.

,, *Hudson's Bay* and *Davis's Straits.*—Hudson's Bay is on the north of Canada and communicates with Davis's Straits through Hudson's Straits.

,, *The arctic circle.*—(Gr* *arktos* a bear, in allusion to the northern .constellation called the Bear.) A

circle parallel to the equator and 23° 28' from the north pole. The zone between this circle and the north pole is called the frigid zone.

98. • *The opposite region of polar cold* —The Antarctic circle around the South Pole.

,, *Polar cold.*—Cold belonging to the Poles, whether north or south.

,, *The antipodes.* -(Gr *anti* against and *pous* a foot.) The opposite side of the globe where the feet of the people are opposite ours.

,, *Engaged.*—Busily at work.

,, *Under the frozen serpent of the south.*—The Serpent is a southern constellation, here said to be frozen because of the intense cold of the regions about the Antarctic Circle.

,, *Falkland Island.*—This is properly a group of islands comprising two large islands and several small ones in the South Atlantic Ocean.

,, *Romantic.*—These islands were to other people so little known that they almost had no real existence. (A romance is a tale of fictitious adventure. Hence anything that has the character of being wild, extravagant, or unreal, and having no practical value, is said to be romantic.)

,, *For the grasp of national ambition.*— For a nation to wish to turn to any practical and profitable account.

,, *A stage.*—These islands, far south and removed from the reach of commerce and civilization, are not the furthest limit to which the American colonists have carried their fisheries. They are only *in the way to* (stage and resting-place) those regions still further south to which the colonists have pushed their enterprise.

99. *Industry.*—(This word is primarily used in the sense of diligence in business. From that it has come to be applied to any particular manufacture or pursuit. Here it means). Fishery.

Page.

99. *Equinoctial heat.*—(L. *æquus* equal and *nox* night) Heat felt in countries under the equinoctial line or equator.

„ *The accumulated winter, &c.*—The cold of the North and South Poles put together.

„ *Draw the line.*—(The fishing line.). Fish.

„ *Strike the harpoon*—Strike whales with the harpoon, which is an iron spear designed to kill whales with.

„ *Run the longitude.*—(Longitude is distance east or west, measured on the equator) Go along the whole distance west as measured on the equator, between the African and the South American coast, where Brazil is situated.

„ *Their gigantic game.*—Killing whales is here called gigantic game on account of the huge or gigantic size of the animal that is sought.

„ *No sea.*—Elliptical for, there is no sea.

„ *But what is.*—Equivalent to, which is not. (Parse " but " as a preposition governing " that, " the relative " what " being a compound of " that which " " But " means except. There is no sea except that which is vexed by their fisheries. That is to say. When we have excepted the seas that are vexed with their fisheries, we shall find that there is no [other] sea [left any where] Taken literally, this passage is not true. It must be regarded as an example of the rhetorical figure called hyperbole.)

„ *Vexed.*—Disturbed.

„ *Toils.*—Labours.

„ *Holland.*—The people of Holland, the Dutch, a principal feature in whose character is perseverance.

„ *France.*—The people of France.

„ *Dexterous.*—(L. *dexter* the right hand.) Quick and clever.

„ *Sagacity.*—Quickness of discernment.

Page.
95. *Of English enterprise.*—That characterizes things undertaken by the English.

 .. *Perilous*—Dangerous. (Whale fishing is always dangerous.)

 ,, *Hard.*—Severe.

 ,, *Pushed* --Carried vigorously on.

 ,, *Recent people.*—So called because they had only recently (as compared with the people of other countries) become a distinct people.

 .. *In the gristle.*—Still in the state of being formed; not yet fully formed. (Gristle is smooth, elastic substance in animal bodies, resembling bone, but not so hard, it looks as if it were bone in course of formation.

 ., *The bone of manhood*—(Metaphor.) The hardness and strength of full-grown men.

 ,, *Any care of ours.*—Any care that we have taken of them.

 .. *Squeezed.*—Pressed.

 ,, *Happy.*—Fortunate.

 ,, *This happy form.*—The reference is to the enterprise and industry that marked the American colonists.

 ,, *Government.*—The British Government is referred to.

 ,, *Salutary.*—Healthful. (Because these colonists were neglected by the mother country, they were obliged all the more to look after themselves. So that the neglect they suffered really did them good by making them enterprising and industrious.)

 ,, *Generous nature, &c.*—The natural character of the people, which showed that they were well (generously, liberally,) supplied with good qualities, has developed itself without any help or direction from elsewhere.

 ,, *The power.*—The power of England, of which Englishmen are so proud, disappears before, cannot be compared with, the power of industry shown by the American colonists.

Page.

99. *Presumption* —Boastful reliance on.

,, *Within me* —In my mind.

,, *The wisdom of human contrivances.*—Human govern-
ments with their system of laws, &c That which
good and watchful and wise government is alone
supposed to be able to do in the way of encourag-
ing the enterprise and industry of a people, has
been accomplished among these colonists without
any such help. Their natural character has done
for them what wise government alone (which is a
human contrivance) has done for other people.

,, *My rigour.*—My opinion that the activities of a
people should be kept under severe restraint by
a wise and watchful government.

,, *Relents.*—Softens down.

,, *Pardon something.*—Pardon to some extent.

,, *The spirit of liberty.*—It was the very freedom of the
colonists that brought out their fine qualities.

,, *Sensible.*—Aware.

,, *In my detail.*—In the detail or particulars I have
given.

,, *In the gross.*—In a general way.

,, *A different conclusion.*—A conclusion or inference
different from mine.

,, *Fighting a people.*—(Parse "fighting" as a transitive
verb ; it is, however, equivalent to fighting against.)

,, *Means.*—That is, means of gaining over the colonists,
of making them favorable

,, *Complexions.*—Temperaments.

,, *The military art.*—The art of war.

,, *Predilection.*—Liking, fondness.

,, *Wield the thunder.*—Put forth military force.
(There may be an allusion to the god Jupiter,
of the old Greek mythology, who, as ruler of the
earth, was believed to punish men by hurling
thunderbolts from heaven against them.)

Page

99. *Arms.*—Military power.

   „ *This knowledge.*—The knowledge of the military art.

   „ *Force*—Military force.

   „ *In a profitable, &c*—So as to keep them subject to England, and enable England to profit by their industry.

   „ *Temporary.*—Lasting only for a time.

   ., *Not governed.*—Not governed, that is, in the proper sense of the word.

   „ *The effect of force*—The result produced by force. Bringing a military force against a people does not always have the effect of frightening them.

   ,. *An armament, &c.*—It does not necessarily happen that if you can get an army together, you are sure to get victory.

   ., *Resource.*—Means.

   „ *Conciliation*—(Nominative absolute.)

   „ *Force failing.*—(" Force " is in the nominati. absolute.) When force has failed. When conciliation (or a peaceful attempt to bring about friendly relations) fails, you can try force; but when force also fails, there are no other means left.

100. *By an impoverished, &c.*—By a government that has used military force (violence) and has been defeated and made itself poor by the cost of a war.

   „ *To force.*—To the use of force.

   . *Impair.*—Render imperfect, injure.

   „ *The object.*—The object sought is allegiance; but when you use force in order to reduce a people to allegiance, you may succeed in subduing them, but the allegiance being forced, is at best imperfect and unwilling.

   ,. *The thing you fought for.*—A willing allegiance.

Page
100. ***Is not the thing you recover.***—Is not recovered in the
full perfect state in which it ought to be.

,, ***Recover.***—Get back.

,, ***But depreciated, &c.***—This is elliptical for " But
you recover it in a depreciated, &c., condition."

,, ***Depreciated.***—(L *de.* and *pretium,* price.) Lessened
in value. (An enforced allegiance is of less value
than a willing one.)

,, ***Sunk***—Low in character.

,, ***Wasted.***—Imperfect.

,, ***Consumed.***—Used up, destroyed by the ill feelings
excited by war.

,, ***Whole America***—The hearts of the people as well
as their bodies; their love as well as their obedi-
ence.

,, ***I do not choose, &c.***—The strength of the American
colonists is really the strength of Britain, and to
fight against them is to exhaust British strength
in both directions at once.

,, ***Caught by a foreign enemy.***—Said in reference to the
likelihood of being attacked by some foreign na-
tion who might take advantage of England's be-
ing in an exhausted condition after a war with the
American colonists.

,, ***I may escape.***—The foreign nation may fail to inflict
on England the injury it sought to inflict.

,, ***Can make no insurance, &c.***—Cannot make sure that
such an event will not happen.

,, ***Break the American spirit.***—Humble them so far as
to take all energy and enterprise out of them.

,, ***Made the country.***—Made America so prosperous.

,, ***Experience***—Practical knowledge.

,, ***Instrument in the rule.***—Means of ruling.

,, ***Utility.***—Usefulness.

,, ***Methods, &c.***—Other means, not war.

Ancient indulgence.—The forbearance by which England has of old been characterized.

• **Pursued to a fault.**—Practised to such an extent as to be injurious.

If feeling is evidence —If our feelings on this subject may be considered a proof of whether a thing is right or wrong.

Our fault.—Indulgence.

More tolerable than.—More bearable than; preferable to

Our attempt to mend it.—Making war upon the colonists as a substitute for indulgence.

Our sin.—Indulgence, if it be a sin. (The writer does not acknowledge that this indulgence is a sin or a fault; he is only speaking hypothetically "That is to say, admitting that it is a sin, then the repenting of the sin, which would mean war, would be worse than the sin itself.)

Salutary.—Wholesome.

Our penitence.—Going to war.

Untried force.—Force, the effects of which have not yet been tried.

Sentiments.—Opinions.

Seem to be so greatly captivated —Seem to be so taken up. (A man is said to be captivated or taken captive by an opinion, when he allows himself entirely to believe it.

Behind.—(Parse as an adverb.) Behind the two considerations already mentioned.

To determine my opinion.—To make me settle in my mind.

Its population and commerce.—These are the two considerations above referred to.

Predominating.—Most strongly marked.

The whole—Character.

An ardent—Affection, understood.

Page.
100. *Restive.*—Stubborn.

  ,, *Untractable.*—Refusing to be governed or controlled.

  ,, *Wrest.*—Take away.

  ,, *Shuffle.*—Push off in an irregular or unequal manner.

  ,, *Chicane* - (Pronounce *shikane*) •Artifice, trickery.

    Think the only advantage.—Think to be. *i e*, regard
    as, the only advantage. (The advantage referred to
    is freedom)

    Fierce.—Strong, not to be subdued.

  ,, *And this from, &c*—Elliptical for, " And this [fact
    arises] from, &c.

  ,, *Which.*—Has for its antecedent " causes."

  ,, *Temper* —Disposition.

    The direction which this spirit takes—The things
    which this spirit in love of liberty prompts them
    to do, and the enterprises and industries which it
    prompts them to undertake.

  ,, *Lay open.*—Explain.

  ,, *England.*—(Metonymy) The people of England.

  :, *Emigrated* —(L. *e* out of, and *migro* to wander)
    Went out. (To immigrate, from *in* into, and
    migro, means to go into. Thus the people emi-
    grated from England and immigrated to America)

  ,, *From you.*—From you who are in England , that is
    to say, from England

101. *This part of your character* —This love of liberty

  ,, *Was most predominant.*—Ruled or influenced by her
    conduct more than any other.

  , *They took this bias* —The colonists showed this stron
    love of freedom. ("Bias" means bent, inclina-
    tion)

  ,, *Parted from your hands.*—Passed beyond your con-
    trol.

  ,, *Devoted.*—(L. *de*, and *voveo* to vow. Hence, a per-
    son or thing consecrated to a certain purpose by a
    vow ; and hence) Strongly attached to.

G

Page
101   *Liberty according to, &c* —The kind of liberty that Englishmen regard as and adjudge to be liberty

,,   *Abstract liberty.*—Liberty as such, apart from any particular form it may take. (L. *abs* from and *traho* to draw : to draw away from.)

,,   *Abstraction.*—An abstract idea. The idea of a thing apart from the object with which it may be associated. Thus a white wall is a concrete idea ; but whiteness apart from the idea of a wall or any other object is an abstract idea

,,   *Inheres.*—(L *in* and *horeo*, to hang.) Is fixed into · is always associated with ,

,,   *By way of eminence.*—More than anything else.

,,   *Criterion.*—'Gr. *crino*, to judge.) A standard or mark by which anything is judged.

,,   *The great contests, &c.*—The people of England have for the most part asserted their freedom by refusing to let themselves be taxed in a despotic way The contests between the Anglo Saxons and Normans and the provisions of the Magna Charta show that The great contest between England, for example, and King Charles I, was owing to the circumstance that the king tried to act despotically and levy taxes on the people without their consent And the war of independence in America, by which the Americans gained their independence, was just owing to the British Government insisting on imposing taxes on a people who, nevertheless, were not allowed to send their representatives to Parliament that they might have a voice as to the way in which the money gained by the taxes taken from them should be expended.

,,   *The ancient commonwealth, &c*—The Republican government that at one time prevailed in Greece and Rome There were notable contests in Rome in the matter of the choosing of Magistrates, among the two orders of which the people of Rome consisted,—the patricians and plebeians.

Page.
101. *The balance.*—The equal distribution of power and political importance among the several classes of the people.

,, *Was not so immediate.*—Was not the first or most urgent question.

., *The greatest spirits.*—Men of the noblest character. Notably such men as John Hampden, who in the reign of Charles I refused to pay a tax called ship-money, which the king was trying to take from the people without first getting the consent of Parliament.

,, *To give, &c.*—To satisfy one that it was an important matter.

,. *English constitution.*—English form of government with its laws

,, *The privilege, &c.*—The right to give money for the support of the state when they (the people) themselves consent to give it, not when it is attempted to be forced from them.

., *A dry point of fact.*—A mere fact, or state of things actually existing.

,, *Ancient parchments.*—Ancient laws, so called because they were engrossed on parchment, which is the skin of a sheep prepared and made suitable for writing upon. The Magna Charta of the time of King John, the law passed in the reign of Edward I relieving the people from liability to be taxed arbitrarily, and the Bill of Rights of the reign of William and Mary, may serve as illustrations of the writer's meaning.

., *Blind usages.*—Practices based on no intelligent reason.

,, *House of Commons.*—So called because it is composed of men who represent the common people. The House of Commons was established as a necessary part of the legislature by the declaratory statute of York in 1322. It is a principle of the English constitution that no tax can be imposed on the

people without the consent of the House of Commons, which is virtually the consent of the people themselves.

101. *Whether the old records, &c.*—Whether the laws provided or not for freedom from arbitrary taxation, the very nature of a House of Commons implied this. (An "oracle" among the Greeks and Romans was the utterance (L. *oro*, to utter) of a god in answer to an enquiry. Hence, a wise or authoritative saying. "Whether the old records had delivered this oracle or not" is, therefore, equivalent to, "Whether the old records, *i. e* old laws, had said so or not.)

„ *Infinite pains.*—(Hyperbole.) Very great pains.

„ *Fundamental principle.*—A law lying at the foundation of a government.

„ *Monarchies.*—Government presided over by a king.

„ *Mediately or immediately.*—Indirectly or directly.

„ *As with their life-blood.*—As it were, along with or at the same time with, their life-blood, which is derived from the mother-country England.

„ *As with you.*—As in your case.

„ *Fixed on.*—(Intransitive verb.) Fixed itself on.

„ *Attached on.*—(Intransitive verb.) Laid hold on, seized upon.

„ *Liberty might be safe, &c.*—In their estimation, liberty might be safe, &c.

„ *Twenty other particulars.*—(Synecdoche, a definite for an indefinite number.) In various other respects.

„ *Here they felt its pulse.*—The question on which the American colonists came into collision with the British Government, was this: They contended that if taxes were imposed upon them, that is to say, money taken from them, they ought to have representatives in Parliament who would have a voice in the disposal of the money. To

allow them to be represented would be to recog-
nize the fact that they were a free people who were
granting their own money. But the English
Government, while it insisted on taxing them,
would not allow them to be represented. This
was to treat them as slaves and to deny that they
had any right to their own property; and it was
"here," that is to say, by the manner in which this
matter of taxation was dealt with, that the Ameri-
can colonists " felt the pulse" of their liberty, that
is to say, judged whether their liberty was in a
healthy and strong condition, or was sick and ready
to die.

101.   *Sound* —In health.

  „   *Your general arguments.*—The arguments you in
England yourselves use in defence of your liberty.

  Theorems and corollaries—Are mathematical terms
used here in a general way to denote deductions
from reasoning. A " monopoly," (Gr. *monos* alone
and *poleo* to sell) is the right held exclusively by
one person or by one set of persons to sell any
given article. (Thus, when we speak of the Govern-
ment monopoly of opium, we mean the right which
the Government alone has to sell opium, no one
else being allowed to sell it.) From this prima-
ry use of the word, *viz.*, the exclusive right to
sell, the word " monopoly" has come to mean the
exclusive possession of anything. This is the
sense in which the word is used in the text. The
meaning of the sentence is this: You cannot
claim to have the exclusive right to reason that a
free nation should grant its own money. The
American colonists claim to exercise the same
right.

  Those general arguments.—The process of reasoning
that you yourselves use.

  Your mode, &c.—The British Government had all along
treated the American colonists in the same way
as it did Englishmen in England, allowing them

the same freedom and the same laws, &c. This
may have been owing to the Government having
been too tender with them, or because it was too
lazy to insist on any different treatment ; it may
have been deliberately done as the wisest course,
or it may have been done by a mistake. Any
way, the effect was to make the American colo-
nists feel all the more certain that they had the
same rights and privileges that, were enjoyed by
the people in England.

101. *Common principles* —Principles that apply both to
the people in England and the American colo-
nists

102. *Confirmed in.*—Strengthened in their belief in

., *Pleasing* —Because it pleased the people to feel that
they had the same rights

,. *Provincial legislative assemblies* -- Legislative assem-
blies are bodies of men appointed to make laws (L.
lex, legis, a law.) They are called provincial, be-
cause they used to be a legislative assembly for each
province or colony. There were several such colo-
nies. There was Virginia planted in the reign of
Elizabeth, Maryland by Lord Baltimore, and New
England by the Puritans in the reign of Charles
I., the Carolinas and Pennsylvania and Georgia.
To each of these colonies the British Government
granted a charter, under which the colonists
had the power to hold legislative assemblies,
elect officers and levy taxes for domestic purposes.

,, *The form of their provincial legislative assemblies.*—
By the " form " reference is made to the fact that
these assemblies had the power to make laws and
levy taxes within their respective provinces.

,, *Lofty sentiments.*—High ideas with respect to liber-
ty, duty and honour.

,, *Aversion from.*—This noun and the adjective "averse"
(from L. *a* or *ab* from, and *verto* to turn,) is more
properly used with the preposition "*to,*".—" averse

to," "aversion to:" The idea of "from" is implied
in the word itself and need not be reproduced in
the preposition, whereas aversion being an affec-
tion or state of the mind with reference *to* its
object, the word ought always to be used with
" to."

102. *Mean.*—Small.

,, *Untractable*—Ungovernable. The reference is to
the love of liberty which the English Government
was vainly trying to control.

,, *Is the law, &c.*—Is law studied so generally, *i.e.*, by
so many of the people

,, *The profession itself*—The legal profession ; that is,
the number of those who gain their living by the
knowledge which they profess to have of law. (The
word "profession" is never used with reference to
any occupation that is merely mechanical. Thus,
a man follows the trade of a blacksmith, but the
profession of law.)

,, *Lead.*—(Pronounce *leed*) It is a noun here from the
verb, to lead.) To take the lead, is to go before,
to undertake the guidance or direction of a matter.

,, *Deputies.*—(L *de* from, and *puto* to thrust, to send.)
Men sent to represent the wishes and opinions of
those who send them. Representatives.

,, *Congress.*—(L. *congredior*, to come together.) The
assembly of the deputies from the different Ameri-
can colonies, when they met together to resist the
claims of Great Britain in the year 1774.

,, *Most.*—Most of the people, *i.e.* the greatest part of
the people. (This word is used as a substitute
for a noun, and may be parsed as a noun.)

,, *Smattering.*—A little knowledge.

,, *That science.*—Law.

,, *Tracts.*—Small pamphlets of a few pages.

,, *Of popular devotion*—Of a religious kind, intended
to help the devotional or worshipping feeling of
people.

Page.
102. *Were so many books, &c.*—Were there so many books
exported as law books

„   *The plantations*—Estates under cultivation by the
colonists. (These plantations were very much
like what are known in this country as indigo-fac-
tories or tea-garden .

„   *Fallen into the way.*—Got into the habit.

„   *Blackstone's Commentaries.*—Sir William Blackstone
was a learned English Judge, who was born in 1723,
and died in 1780. It was as Vinerian Professor of
the common law that he produced those lectures
which he afterwards published as "Commentaries."

„   *General Gage*—General Thomas Gage was the Com-
mander-in-Chief of the British troops in North
America, and the last British Governor of Massa-
chusetts. He died in 1787.

„   *On your table.*—Burke was addressing the Speaker of
the House of Commons. A paper laid upon the
Speaker's table meant a paper laid before the
House of Commons.

„   *In his government.*—Within his jurisdiction ; *i.e.*, Mas-
sachusetts.

„   *Chicane.*—(Pronounce *shikane*). Cunning, deceit

„   *Evade,*—Get out of the way of ; escape from.

„   *Capital.*—(L. *caput*, the head.) Most important.

„   *Penal constitution.*—By "constitution" is meant that
which has been constituted or framed. (Here the
word is used in the sense of laws.) (Penal from
the Latin *pœna*, punishment, means punishment-
inflicting.) Hence a penal constitution or law is a
law that prescribes punishment for certain offences.
The reference is probably to the Stamp Act which
the colonists evaded by entering into a resolution
not to use stamps or import goods from Eng-
land, and even to stop exports, and a society was
formed for the encouragement of native manu-
factures.

Page.
102.   *Smartness of debate.*—People possessing smartness, or cleverness, in the discussion of a matter.

,,   *That this knowledge, &c.*—That their knowledge of law, instead of being the cause of their resisting the laws, should have helped them to understand that they were bound to obey them, and that they would be punished if they rebelled.

,,   *Their obligation to obedience.*—Their being bound to obey.

,,   *Mighty well.*—(Parse "mighty" as an adverb quali fying the adjective "well." The word mighty is used here only as an intensive.) Exceeding ly good.

,,   *My honorable and learned friend.*—The Attorney-General.

,,   *On the floor.*—Have the right to speak.

,,   *Animadversion.*—(L. *animus* mind, and *adverto* to turn to.) Remarks by way of criticism.

,,   *Will disdain that ground.*—Will scorn to use that argument.

,,   *When great honours, &c.*—When the government has no honours and high pay to offer to those who have a knowledge of law.

,,   *Adversary.*—Enemy.

,,   *The spirit.*—The spirit of resistance to government.

,,   *The happy methods.*—Honour and emoluments.

,,   *Litigious.*—Fond of going to law.

,,   *This study.*—The study of law.

,,   *Dexterous.*—Expert. (L. *dexter*, the right hand.)

,,   *Resources.*—Means.

,,   *Mercurial.*—(Formed under the influence of Mercury, one of the gods of ancient mythology.) Sprightly, full of vigour.

,,   *Cast.*—Temper, character.

,,   *Ill.*—(Adjective.) Evil, wrong.

102. *An 'actual grievance*—An injury that actually happens.

„ *Here.*—Among the American colonists.

„ *Anticipate.*—Look forward to the evil before it actually comes to pass.

„ *Pressure.*—Weight, heaviness.

„ *Augur.*—Foretell. (L. *aris* a bird. Among the Romans, an augor was an officer who foretold future events according to the singing, &c., of birds.)

„ *At a distance.*—Before it actually happens.

„ *Snuff*—Get the smell of. Find out beforehand.

„ *The approach of tyranny.*—That something tyrannical, that is, something designed to curtail their liberty, is about to happen.

„ *Tainted breeze.*—Breeze carrying a bad smell with it. (Metaphor) Every measure of Government which has the appearance of being intended to lessen their liberty.

„ *The last cause of*—The last of the reasons that may be given for. The reference is to the distance at which the colonies were from the mother country

103. *Deep.*—(Adverb.) Deeply.

„ *In the natural constitution.*—The allusion is to the geographical distance between America and England.

„ *In weakening Government.*—In making the control of Government over the colonies weak.

„ *Between the order and the execution.*—Between the passing of an order in England and its being executed in America.

„ *System*—Scheme.

„ *Winged ministers of vengeance.*—(A minister, from the Latin *ministro* to serve, is a servant.) Servants that fly to execute vengeance or inflict punishment. The reference is to the artillery used in war, the shot from which fly through the air

Page.

(hence said to be "winged,' *i e.* having wings,)
and strike and kill those against whom they are
directed.

,, *Bolts.*—Arrows, pointed shafts. (Among the ancients,
Jupiter, who governed the world, was supposed to
punish men by means of thunderbolts hurled
down from heaven. A government sending its ar-
mies with guns against a rebellious people is likened
to Jupiter hurling his thunderbolts.) The shot
discharged from guns.

,, *Pounces* —(Norman *ponce*) Hands.

,, *Arrogance* —Pride.

,, " *So far*," &c --This is a quotation from the Bible.
See Job XXXVIII ; 11, where God is represented
as having bounds to the sea.

,, *That should fret* —That you should fret. (To fret
is properly to rub or wear away by friction. Hence
it comes to mean to irritate or vex. This is its
meaning when it is used as a transitive verb. In
the text, however, the verb is used intransitively,
and means to be irritated or vexed)

,, *Rage.*—(Intransitive verb.) Be furiously angry.

, *Bite the chains of nature* —(Metaphor.) Just as a
wild beast when chained is tempted to bite its
chain in order to be able to escape, so the English
people are represented as fretting and raging be-
cause, owing to the distance placed by nature
between England and America (the Atlantic divid-
ing them) they cannot govern the colonies as
completely as they would have done had those
colonies been nearer. " Who are you," asks Burke,
"that you should be angry because you cannot do
away with the distance of space (chains of nature)
which holds you back from carrying out your
angry purposes?"

,, *Extensive empire.*—Observe that the absence of the
article "an" gives to "empire" the abstract
idea of rule or government, whereas its presence

would have given "empire" a concrete meaning, that is, it would have made it mean some particular empire.

83 *The forms, &c.*—The modes in which government is conducted

" *The circulation of power, &c* (Metaphor) The allusion is to the circulation of the blood through the body. It is discharged from the heart through the arteries to the furthest parts (extremities) of the body, and then passing along the veins on its way back, ultimately returns to the heart, from which it is again sent forth to all parts of the body. This is why the blood is said to circulate or go round. In the same way, power or authority comes forth from the central seat of Government (England), and reaches out to all the countries (some of them at a great distance away) subject to England. But as the blood flows most forcibly near the heart, and its flow gets weaker as it goes further away from the heart, so the authority of the English Government must be weaker in America than it is in England.

" *Nature had said it.*—It is a law laid down by nature. It is true in the physical world, and it is equally true in the political world.

" *The Turk, &c*—Egypt in the north of Africa, Arabia separated by sea and desert from Turkey, and Kurdistan in Western Asia all belong to the Turkish Empire; but Turkey cannot govern them so completely as it does Thrace, (formerly a province of Greece, afterwards annexed to the Ottoman Empire,) which is much closer.

" *Crimea.*—A peninsula on the South of Russia and washed by the Black Sea. It was held by the Turks from the year 1495 to the year 1783 when it became part of the Russian empire. It was the scene, in 1854, of the war between the English and French on behalf of Turkey on the one side and Russia on the other.

103. *Algiers.*—On the north coast of Africa, conquered by the Saracens in the year 667, and governed by a Bey till 1830 when the French took possession

„ *Brusa.*—In Asia Minor. It continued to be the Turkish capital till the capture of Constantinople in 1453.

„ *Smyrna.*—A town of Asia Minor, captured by the Turks in 1424.

„ *Despotism itself*—(A despot. is a ruler who has absolute power) Even a despotic government, in which the people have no voice at all, but are ruled by the absolute will of one man.

„ *Truck and huckster*---(To give in exchange as in buying and selling ; and to sell small articles.) The meaning is that even when a ruler is absolute, and rules just according to his own will, and not constitutionally as in England, he can not altogether do as he pleases, but must allow some amount of freedom and independence to his distant subjects as the price he pays for their recognition of him as their sovereign.

„ *He governs with a loose rein*—(Metaphor) As a horse is driven by means of reins, so a nation is governed by its sovereign. If the reins are held tight, the horse is restrained ; when the reins are held loosely, the horse can go as fast as it likes. So the Sultan of Turkey does not dare to let his power be too much felt (draw a tight rein) in his distant provinces : He is obliged to let the rein be loose, that is, let those provinces have a certain amount of independence.

„ *That he may.*—In order that he may.

„ *In his centre.*—The central seat of Government, Constantinople.

„ *The whole of the force, &c.*—The meaning is that the Sultan retains his power in Turkey itself which is the centre of his empire, just because he does not enforce his authority too much in

the distant provinces of his empire. If he made his authority felt too much in those provinces, they would rebel and throw off his yoke, and then his power as Sultan of Turkey itself would be greatly weakened, if not destroyed.

103. *Relaxation.*—Loosening.

„ *Borders.*—Outlying dependencies.

., *Span in her provinces.*—The principal provinces of Spain are in South America

., *Complies.*—Yields to the wishes of her subjects in these distant dependencies.

„ *Watches times.*—Watches opportunities for enforcing her authority.

.. *Immutable.*—(L. *in* negative, and *muto* to change) Unchangeable.

„ *Of religion in the northern provinces.*—The Protestant faith, ████████ .

„ *Remoteness.*—Distance.

., *The first mover of Government.*—The king.

„ *It has grown, &c*—As the people have grown in numbers and strength, so their love of liberty has grown.

„ *"A spirit.*—(In opposition to " fierce spirit.")

„ *Meeting with.*—Being opposed by

„ *An exercise of power in England.*—The reference is to the tax on tea, glass, paper, &c., in British America in the year 1767

„ *Not reconcilable, &c.*—Cannot be reconciled with, &c.

,. *With theirs.*—With the ideas which the American colonists have.

„ *This flame.*—This war.

„ *Consume us.*—Destroy our power.

SYDNEY SMITH.

Thk Revd Sydney Smith, an eminent English Divine, was born at Woodford in Essex, in the year 1771 He was educated at Winchester School and New College, Oxford. He officiated as curate at Nether Avon for two years, and then became tutor to the son of Mr. Hicks Beach, member of Parliament for Cirencester. He next went to Edinburgh where he remained five years. At this time he became acquainted with Henry, afterwards Lord Brougham, and Francis Jeffrey, afterwards Lord Jeffrey. Among them they started the "Edinburgh Review." Sydney Smith being editor. But he edited only the first number which appeared in 1802. In 1804 he went to London. Sometime before, he had married the daughter of Mr. Pybus, a banker. In 1806, Lord Erskine gave him the living of Foston le Clay in Yorkshire. In 1830, he exchanged this living for that of Combe Florey in Somersetshire. Soon after, he was appointed one of the canons at Bristol Cathedral, and afterwards at St Paul's. His chief writings were " Letters on the subject of the Catholics by Peter Plymley," "The Works" which consisted of a selection of his best articles from the Edinburgh Review, and Sketches of Moral Philosophy. His writings were distinguished by their cleverness, wit and humour. He died in London in 1845.

Page.

116 *Original diffirence.*—(L. *origo* beginning) Difference from the beginning, *i. e.* natural difference

,, *Capacity.*—Mental power.

,, *Association.*—The connecting together of ideas.

,, *Fanciful.*—Full of fancy, not real.

,, *In the understanding &c.*— Between the understanding (mental power) of men and those of women.

,, *Every day* —(Parse " day " as in the objective case governed by the preposition "on" understood.

117. *Conjectural difference.*—Difference only supposed or conjectured to exist.

,, *Conformation of mind.*—Manner in which the mind is formed or constructed.

,, *Trundle.*—Drive.

,, *Called into action.*—Given exercise to.

,, *Occasion.*—Need.

,, *Abstruse.*—(Hidden ; hence) Difficult to be understood.

Page.

117. *Phenomenon.*—(The plural is phenomena.) Remarkable appearance. (The phenomenon referred to, is the difference in understanding between men and women)

,, *That nature, &c.*—That women have naturally quite as powerful understandings as men.

,, *Incumbent on.*—(Literally, lying upon) The duty of.

,, *Communication.*—Imparting, giving.

,, *Should learn.*—Ought to learn.

,, *Immense.*—(Literally, immeasurable.) Very great

,, *Disparity.*—Inequality.

,, *Between their knowledge.*—Between the knowledge given to men, and the knowledge given to women.

,, *Rational.*—Reasonable.

,, *Defence.*—Justification.

,, *Colloquial phrase.*—(L. *con* with, and *loquor* to speak.) Phrase used in common conversation.

,, *Upon their hands.*—In their possession.

,, *Excluded.*—Shut out from.

,, *Serious business.*—Business requiring anxious thought

,, *Sources of exertion*—(Parse "sources" as a noun in apposition to "lawyers, physicians, &c.," or rather to the occupations of these men.) Pursuits requiring exertion.

,, *Producing and suckling.*—(Nouns, subjects of the predicate "consume" understood.)

,, *Attainments*—Knowledge of, and skill in.

,, *Bar.*—Set aside.

,, *The mere novelty of teaching.*—The fact that it would be a new thing to teach.

,, *Pernicious.*—Injurious.

,, *Unusual extension of knowledge.*—Knowledge extended to, or communicated to females, which is not usual.

Page.

117. *Sensation.*—Feeling.

,, *Ludicrous.*—(Parse as a noun, although the word is properly an adjective.) A "sensation of the ludicrous" is a feeling that there is something laughable in a thing.

,, *Absolute.*—Entire, complete.

118. *Country gentlemen.*—So called because they live in the country (mofussil) as distinguished from the towns, where there is more civilization and better means of acquiring knowledge

,, *Supposed.*—Who would have supposed.

,, *Carried up to.*—Gradually taught as far as.

,, *Elements.*—Leading facts.

,, *To take.*—To mistake, to confound.

,, *The actual.*—That which exists.

,, *The possible.*—That which may be, but which has not yet any actual existence.

,, *Which is.*—Which actually exists.

,, *Can be.*—Can ever exist.

,, *First to laugh*—Nothing is more common or more stupid than first to laugh.

,, *Deviation.*—(L. *de* from, and *via* a way.) Departure from, turning away from.

,, *Practice*—What is usually done.

,, *To be astonished.*—More common, &c, than to be astonished.

,, *Pedantic.*—(Fr. *pedant*, a school-master)• Fond of showing off one's learning.

,, *Affected.*—Pretending out of a silly vanity to appear to be that which one really is not.

,, *Offensive.*—Disagreeable.

,, *Stepping out of.*—Going beyond.

,, *Ostentatious display.*—Display made for the mere sake of show.

Page.
118. *To eat of the tree of knowledge.*—(To eat the fruit
of the tree of knowledge. The allusion is to the
account to be found in the Bible, in the book of
Genesis, of the Garden of Eden, in which our first
parents Adam and Eve were placed. God told
them "that they might eat the fruit of all the
trees in the garden except the tree of the know-
ledge of good and evil " It was the fruit of this
tree that they were tempted to eat, and, by this
means, they brought sin and suffering into the
world) The phrase "the tree of knowledge" has
come to be commonly used to denote knowledge,
to eat of the tree, is to acquire knowledge.

,, *The same kind of aerial and unsatisfactory diet —*
Knowledge. Knowledge would be very poor food
for the body.

,, *Aerial —*Airy, unsubstantial.

,, *That man does every thing, &c.* } Noun—sentences
,, *That everything we see, &c.* } in apposition to "common cause of error."

,, *Positive institution.*—What has been express
established for a given purpose.

,, *Original feeling —*Natural feeling : or feeling born
with men.

,, *Institution of nature.*—What nature has appointed.

119 *Can aid, &c.*—Can make the love of a mother strong-
er or more full of resource.

,, *Or the article &c —*Or that the knowledge of the
arts and sciences will tend to destroy parental
love, *i. e.* prevent mothers from loving their
children.

,, *Economy.*—(Gr. *oikos* a house, and *nomos* a law.)
Household management.

,, *Nor idleness.*—Ought to be "or idleness," the nega-
tive idea being already supplied in the adverb
"not," which qualifies the verb which governs
"idleness."

Page.

119. *There can surely be*, &c.—The argument of the entire passage is this :—The love of order and economical habits in a family are not owing to ignorance and idleness on the part of mothers and daughters, but owing to the fear lest, if they do not practise them, the consequence will be that the family will suffer poverty, confusion, and ruin. But besides this fear, there is also the desire to surround one's self with beautiful things and to make a show ; and surely all these motives put together will prevent any supposed evil effects from women acquiring knowledge.

„ *Perilous inroad.*—(Irony)

„ *Inroad.*—A riding into, an invading or attacking.

„ *Rather*—Parse as an adverb.

„ *Objections made to human nature*—Objections against men generally acquiring knowledge, whether they be males or females.

„ *Eccentricity*—(L. *ex* out of. and *centrum* the centre. Departing from the centre) Departure from what is ordinarily expected ; oddness, or singularity of behaviour.

„ *Self-complacency*—The state of mind in which one is pleased with one's self.

„ *Want.*—Be in want of.

„ *A part of the world.*—Women.

„ *Any distinction*—Any quality or acquirement that distinguishes them from other women.

„ *So are foolish men.*—Elliptical for—" So are foolish men apt to be proud."

„ *Cultivated persons.*—Persons whose minds have been educated and whose tastes have been refined.

„ *Wrong-headedness.*—Obstinate adherence to one's wrong opinions

„ *We should make, &c.*—We ought to make, &c. That is, we ought to accuse men as well as women.

(81)

Page

119. *Dismiss it altogether.*—Make no accusation at all.

,, *Pedantry.*—A boastful display of learning.

,, *Obtrusion.*—A thrusting upon the attention of another

,, *Embarked.*—(Participle) This word properly means putting on board a barque or ship. Hence, engaged in.

,, *Ostentatious-obtrusion of knowledge.*—This is not a correct defination of "pedantry." "Pedantry,' from the French *pedant,* is an obtrusion of *learning,* not knowledge; that is to say, knowledge that has been acquired by the extensive study of *books.* Soldiers, sailors and others may have a knowledge of their respective professions, but this knowledge cannot be called learning.

120. *To be sure*—An infinitive phrase, equivalent to "certainty," and may be parsed as an adverb.

,, *Destitute of any pursuit.*—Without anything to do.

,, *Frivolous.*—Trifling, petty.

,, *Elevated curiosity.*—A desire for higher knowledge than what belongs to mere household concerns.

,, *Diluted.*—(To dilute a liquid is to make it weak or thin by adding more liquid. Hence) Weakened.

,, *Culler.*—One who culls or gathers.

,, *Simples*—(Noun in the plural number.) Herbs. (In allusion to woman's having to cook for the family.)

,, *Innocent*—(This adjective is applied sometimes to a person, as, the man is innocent; and sometimes to a thing, as, innocent food, that is to say, food that will not harm. (L. *in* not, and *nocco* to harm.) Harmless.

,, *Can occupy*—Can keep engaged.

,, *To be occupied.*—To be wholly taken up.

,, *Analysed*—(Gr. *ana* and *luo* to loosen, a loosing, or the separating of a thing into its component parts) Found out by examination.

Page.

120. *Synonymous.*—(Gr. *sun* with and *onoma* a name.) Having the same meaning as.

" *Jealousy.*—Fear of rivalry.

" *A due proportion of failures.*—A certain number of women who will not succeed in acquiring the higher knowledge.

" *Otherwise.*—That is, not wise : without proper education.

" *Their interests.*—The interests of ignorance and folly.

" *Candour.*—Frankness.

121. *In point of sex.*—Because they are men.

" *In point of fact.*—In reality.

" *Liberal.*—Generous-minded.

" *Bordering upon*—Close upon.

" *To the other sex.*—Women being disposed to be agreeable to men, and men to women ; and this fact will always prevent there being any rivalry between men and women if women are educated.

" *Presupposing.*—Supposing such a desire beforehand

" *A common pursuit*—That which is sought after by both sexes alike. (The reference here is to knowledge.)

" *Than a cause*—Rather than a cause.

" *Contention.*—(From the verb, to contend.) Strife, rivalry.

" *Reserve*—(Noun.) Restraint from freedom in words and actions.

" *Such beautiful effects.*—Delicacy and reserve.

" *Tenor.*—Drift, tendency.

" *Women are delicate &c.*—The whole of this sentence is an example of irony.

" *Hazardous.*—Dangerous. Modesty and refined manners protect women from the dangers to which they would otherwise be exposed.

" *Vigilance.*—Watchfulness.

Page.
121. *Mild virtues.*—Such as modesty, reserve, refined manners.

,, *Stern.*—Severe, rigorous, unrelenting.

,, *Magnanimous.*—(L. *magnus* great, and *animus* the mind) Great-minded.

,, *Stern and magnanimous virtues.*—Such as justice, honour, the chivalrous defence of the weak and oppressed, and so on.

,, *At their hands.*—From them.

,, *Hazard.*—(Verb.) Risk.

,, *Proposition.*—(L. *pro* before, and *pono* to place.) A statement.

., *It is the best method.*—(Parse "it" as having for its antecedent, the acquisition of knowledge.)

,, *Exempted.*—(L. *ex* out of, and *emo* to buy. Bought out of Hence) Delivered from, freed from.

., *All necessary labour.*—All necessity for labour.

., *Do something with*—Make some use of.

,. *Upon the whole.*—All things considered.

122. *That idleness.*—That leisure-time; that time in which people have nothing to do, and which they spend idly.

., *In nations far advanced in civilization.*—Among less civilized people, women do all the work of the household and have their time fully occupied. Among the more civilized and well-to-do people, the menial work of the household is committed to servants, and the members of the family have plenty of time upon their hands.

,. *He must feel.*—Equivalent to, he will be sure to feel.

,, *Drawing her resources from herself.*—Depending upon herself for the means of pleasantly and profitably occupying her time.

,, *In circulating.*—Commonly used by people.

122. *Inimical.*—(L. *in* negative, and *amicus* a friend.) Unfriendly, opposed to.

,, *Which requires more vigilance.*—Which has to be more carefully guarded against.

,, *Current*—(L. *curro* to run.) Commonly used.

,, *Resorted to.*—(Fr. *resorter* to go.) Gone to applied to, made use of.

,, *Sovereign.*—(Adjective, qualifying authority.) Absolute. ~~supreme~~.

,, *Commonplaces.*—(This word is often used as an adjective, as, a commonplace remark. Here it is a noun, and by itself means) Commonplace remarks.

,, *The benevolent affections.*—The feelings which prompt them to show active good will to others.

,, *Impassioned.*—Full of passion.

,, *All of short duration.*—All these feelings are of short duration.

,, *Or*—Otherwise.

,, *Exaggeration.*—A statement that exceeds the truth.

,, *Nurse.*—Elliptical for, "let them nurse."

,, *Want it,*—*i e.,* the task of nursing.

,, *Them*—Father, mother, &c.

,, *The accidents.*—Events or circumstances which happen unexpectedly, and which do not belong to the ordinary course or routine of things

,, *Agitations*—Thoughts or circumstances that excite the mind.

,, *Above the level of common existence*—Things, like scientific reading or literature, which raise the mind above the common thoughts and cares of household life.

,, *Ought to have in view.*—Ought to cultivate.

,, *Intervals.*—Opportunities for exercising compassion which occur in the midst of our regular duties, whatever they may be.

22. *Scattered up and down, &c.*—Occur every now and
   then in the midst of, &c.

23. *Are to be* —Are expected to be.

,, *Interval.*—The mean time.

,, *Is all, &c.*—This question is all, &c. ; that is to say,
   all that the writer is contending for is, that the
   leisure time that woman have, ought to be filled
   up by a literary education

,, *Notoriety.*—Publicity. The objection being that if
   women cultivate literature, they will become pub-
   lic characters, and this will take their attention
   away from feminine pursuits.

,, *The cultivation of knowledge.*—The acquiring of
   knowledge.

., *To defend and reply.*—To defend her opinions in
   print, and publish replies to those who criticize
   her writings.

,, *To squabble, &c* -(This is added parenthetically,
   as an illustration of the kind of thing about
   which women may be supposed to enter into pub-
   lic controversy.) To argue, to quarrel.

; *The tomb of Achilles.*—Achilles, who is the hero of
   Homer's Iliad, was the son of Peleus king of the
   Massedonians in Thessaly, and Thetis. Hav-
   ing been apprised that his fate was either to gain
   glory and an early death, or to live a long but in-
   glorious life, he chose the former, and joined
   the Trojan expedition. Before the walls of Troy
   he slew Hector. He himself fell in the battle at
   the Scæan gate before Troy was taken. His
   remains were buried in a golden urn in a place on
   the coast of the Hellespont, where a mound was
   raised over him. Later accounts of his death
   differ very much : some maintaining, that he did
   not fall by human hands, but was killed by Apollo
   himself ; and others, that he was assassinated in
   the temple of Apollo at Thymbra. Alexander the
   Great, on his way to Persia, offered sacrifice at his
   tomb in Sigæum.

Page.
123. *The plain of Troy.*—To squabble about the plain
of Troy, is to dispute as to whereabouts exactly
this plain was situated. Troas, or the territory
of Ilinm, formed the north-west part of Mysia.
Considerable difficulty has been felt in identifying
the rivers which flowed through the plain of
Troy, and even the locality of the city itself.
Recent discoveries, however, have done much to
set these difficulties at rest.

Opera.—An opera is a dramatic composition set to
music and sung on the stage.

" *Concert.*—A musical entertainment.

" *The exhibition.*—The earliest Art Exhibition in Eng-
land took place in 1760, and in 1769 there was
instituted the annual display of the Royal Aca-
demy which is "the exhibition" referred to in the
text.

" *Ostentatious part.*—That section or body that are
most fond of displaying their learning.

" *Laying themselves before the public.*—Coming be-
fore the public as authors.

" *To be talked of*—To be spoken about in public.

" *As Mrs. Marcet.*—In the way in which Mrs. Mar-
cet, &c.

" *Mrs. Marcet*—Born 1769; wife of Dr. Marcet,
an eminent physician. She published works on
chemistry, political economy, natural philosophy,
&c, in the form of conversations for the instruc-
tion of young persons. Died in 1858.

" *Mrs. Somerville.*—An eminent scientific writer,
who was engaged by Lord Brougham to write a
popular account of the French mathematician
LaPlace's work, The "Mecanique Celeste." She
also wrote "On the connection of the Physical
Sciences" and "Physical Geography." Born in
1790.

" *Mrs. Martineau.*—Born in 1802, and died only a few
years ago. She was well known for her literary

compositions. Among numerous other works she wrote "The Horse and the Man," "Eastern Life, past and present," and "The History of England during the thirty years' peace."

123 *The exception.*—The freedom which women enjoy.

,, *Commerce.*—Intercourse.

,, *Incur.*—Accept, undertake

,, *Speculative difficulties.*—Difficulties of opinion and judgment in literary or other questions which have no concern with the practical duties of life.

,, *Languid.*—Indisposed to make any effort.

,, *Intellectual degradation.*—Men always have some kind of business to do, which gives them intellectual exercise, so that their mental powers need never go to decay. Women have not this incitement.

,, *The school of events*—The school of practical experience.

124. *From the one sex.*—Men.

,, *By the other.*—Women.

,, *We can see, &c*—The fact that there is this difference of condition between men and women is no reason why women should have an inferior education.

,, *They have nothing serious to do.*—(Elliptical for, " it is argued that they have nothing," &c)

,, *They are exposed to great dangers.*—It is argued that they are exposed, &c.

,, *Industriously weakened.*—That they should be weakened not from mere neglect, but that pains should be taken (industriously) to weaken them.

,, *Frittered down.*—Wasted away.

,, *Trait.*—(Pronounce *tray.*) Feature.

,, *Magnitude.*—Greatness.

,, *Instance.*—Example.

.. *Well or ill brought up.*—Well brought up or badly brought up.

(88)

Page.
124.   *Within its bosom.*—Within the country.

 Baffles all remonstrance.—Refuses to be influenced by any reasoning intended to turn one aside from an evil course

.,   *Forms a combination*—When united together in one person.

,,   *To corruption*—Which tend to corruption or moral ruin.

,,   *Within his grasp.*—To have a thing within one's grasp is to have complete influence or control over it

.,   *Fanatical*—Wild or extravagant in his religious opinions.

,,   *Factious*—Having a party-spirit, quarrelsome.

.,   *In his political life.*—As a politician, or one concerned in the welfare of the State

125   *Equitable.*—(L. *equus* equal.) Just, upright

.,   *Mediator.*—(L. *medius*, between.) One who comes between two contending parties with a view to reconcile them.

.,   *In his civil life.*—As a citizen.

.,   *Lustre.*—Fame.

,,   *Order*—Harmony.

,,   *Character*—The characters of children who are to be the future men and women.

,,   *Inspire.*—(L. *in* into and *spiro* to breathe.) Breathe into, excite, create.

.,,   *The future man.*—The boy who will afterwards grow up to be a man.

.,   *Insensible.*—Unconscious.

,,   *Imitation of the child.*—Imitation practised by the child.

,,   *Contagious.*—(L. *con* with, and *tango* to touch.) Any thing that is communicated from one person to another by contact or touch. (Certain di-.

age.*

seases are in this way said to be contagious. So too, the spirit or disposition which one man shows will be awakened in the minds of others who come in contact or have intercourse with him.)

125. *A merely accomplished woman.*—A woman who has only accomplishments. By "accomplishments" are usually meant, music, singing, dancing, drawing, painting, and ornamental needle and other works, acquirements which are taught to girls often at the expense of that thorough literary education which is too often neglected.

„ *Are given up*—Are laid aside. When a girl marries and is surrounded with household cares, she is often obliged to give up practising the accomplishment she had learnt for want of time.

„ *Declines the fatigue.*—Refuses to take the trouble to look after her children.

„ *Attending.*—(Participle qualifying "she" understood) which may be regarded as being in the case absolute.)

„ *This branch of knowledge—such science.*—Any particular branch of knowledge or science that may be spoken of.

„ *Valuable tastes*—A liking for valuable or useful knowledge

„ *Abide by him.*—Remain with him.

„ *Sublimities*—Heights.

„ *Lay the foundation, &c.*—Help to form a noble character in her child.

„ *Absorbed*—Entirely occupied with.

„ *Trifling.*—Wasting time in trifling or frivolous pursuits.

„ *Little.*—Few.

„ *As many understandings.*—As many men having understanding.

„ *For the discovery.*—Owing to the discovery.

Page.
125.   *Barometers.*—(Gr. *baros* weight, and *metron* a mea
       sure.)   An instrument for measuring the weight
       of the atmosphere, and so indicating the changes
       in the weather.   ·

,,   *Thermometers.*—(Gr *therme* heat, and *metron* a mea-
       sure.)   An instrument for measuring the heat of
       the air.

,,   *Inventions.*—(L. *in* upon, and *venio* to come . to come
       upon, and to find out.)   Contrivances   (The dif-
       ference between a discovery and an invention is
       this, that a discovery is merely the finding out of
       something that already existed but had not been
       previously known, whereas an invention is the
       creating of a certain combination which had not
       previously existed)

,,   *Reaping.*—(Metaphor taken from the harvest-field.)
       Realizing.

.,   *Ingenuity.*—(L. *ingeniosus*)   Cleverness.   (The two
       adjectives " ingenious " and " ingenuous " must
       not be confounded together.   Ingenious means,
       clever, full of contrivance, and its Noun is inge-
       nuity.   Ingenuous (L. *ingenuus*) means frank,
       open, and its noun is ingenuousness.)

., ·   *Dryden*—John Dryden was born in 1631, and died
       in 1700.   He was a poet who, however, mainly dis-
       tinguished himself in the dramatic line.   One of
       his principal productions is, an " English transla-
       tion of the Latin Poet Virgil."   On the death of
       Sir William Davenante, he became Poet Laureate.

,,   *Pope.*—Alexander Pope, an English poet, was born
       in 1688, and died in 1744.   He was the author of
       a metrical translation of Homer, and among his
       other best known poems are his Essay on Criti-
       cism, his Essay on Man, his Rape of the Lock, and
       his Windsor Forest.

.,   *Milton.*—A great English Poet, was born in London,
       in the year 1608.   He was first educated at St.
       Paul's school, and afterwards at Christ College,
       Cambridge, where he took his degrees in arts

He was intended for either the Bar or the Church, but, not caring for either calling, he returned to his father, who lived at Horton in Buckinghamshire. Here he wrote his "Comus," "L'Allegro," "Il Penseroso," and "Lycidas." In 1673 he travelled in France and Italy, and, on his return, undertook the education of his nephews. During the quarrels between the King and the Parliament, he became a political writer on the popular side, and published some pamphlets against the bishops. In 1643 he married the daughter of a Justice of the Peace in Oxfordshire, but they were not very happy together. He continued on the side of the Parliament even after the execution of King Charles I, and wrote his "Eikon Basilike," against the king's book of prayers and meditations. About this time he lost his sight owing to natural weakness and hard study. In 1652 his wife died, and he married again. All through his life he was a determined republican, and wrote much against monarchical government. He tried to prevent the Restoration, which he had reason to fear, as he had taken an active part in the Rebellion ; but by the interest of Sir William Davenant and others, he obtained a pardon. Soon after this his second wife died, and he removed with his family to Buckinghamshire, where he completed his "Paradise Lost." He afterwards wrote "Paradise Regained." He also wrote a drama called "Samson Agonistes." Among his prose works there is his "History of England," which comes down only to the Conquest, and his "Areopagitica." He died in 1647, and was buried at the Parish Church of St. Giles', Cripplegate A monument has been erected to his memory in Westminster Abbey.

125. *Shakspeare.*—Was born at Stratford-on-Avon, Warwickshire, in the year 1564, and his father was a wool merchant. At this school he learnt the rudiments of the Latin language, but was not able to make further progress, as he was taken home to follow his father's business. At the

age of eighteen he married, in 1582, the daughter of one Hathaway, a farmer, in the neighbourhood. After some time he left his business in Warwick- shire and went to London, where he became ac- quainted with several actors. His first connection with the stage, was in the capacity of an actor. Shakspeare wrote thirty-seven plays, beside the poems of " Venus and Adonis," " Tarquin and Lucrece," and a collection of sonnets. His chief plays are "Henry the Sixth," " Henry the Eighth," " The two Gentlemen of Verona," " Love's Labour lost," " The Comedy of Errors," " The Taming of the Shrew,' " Romeo and Juliet," " Hamlet," the " Midsummer Night's Dream," " All's well that end. well," The Merchant of Venice," " Much ado about nothing," " As you like it," " Twelfth Night," and "The Merry Wives of Windsor." During the latter part of his life, he wrote the tragedies of " Othel- lo," " Macbeth," and "King Lear." In 1612, he re- tired to Warwickshire, where he died in 1616, having just completed his fifty-second year. Shakspeare's knowledge of mankind has become proverbial.

125. *That such individuals.*—Because such individuals

" *Embellish*—Make life beautiful, by adding to the number of beautiful thoughts that one may have learnt

126. *The talent.*—The intellectual power.

" *Runs to waste.*—Is wasted

., *Attribute.*—Quality.

" *Has obtained* —(Parse as an intransitive verb). prevailed.

, *A common.*—An open plain, growing only grass, (called a common, because it is a place resorted to by people commonly.)

" *For general nature.*—For the use that nature intend- ed.

" *Kept down.*—Not allowed to be developed.

" *Of reason.*—Containing severe thought or reasoning whether in philosophy or science.

Page.

126. *Conclusive reason.*—A reason which admits of no further argument.

,, *Drawn out* —(The word "educated" from the Latin *ex* out of, and *duco* to lead or draw, is exactly synonymous with "drawn out.")

,, *Is in conformity with.*—Agrees with.

,, *It lies.*—The burthen of proof lies.

,, *The paradox.*—(Gr. *para* contrary to, and *doxa* an opinion.) A contradiction.

,, *Munificent.*—Exceedingly liberal

,. *Keep you u der.*—(Parse "under" as an adverb) Keep you under control.

.. *Prune* —To cut off what is superfluous.

,, *The other half of the creation.*—The men.

,I *Stupify.*—Make stupid.

,, *Stupify and enfeeble the minds of women to our hands.*—Give us women whose minds are already made (to our hands) stupid and feeble by nature.

,,• *A narcotic process.*—("Narcotic" means sleep or stupor producing. When a person is made to take a narcotic medicine periodically, he is said to be placed under a narcotic process. In like manner, there are some people who by their steady opposition to female education, try to put the minds of women under a narcotic process, that is, to deaden or make them indifferent to all intellectual pursuits and pleasures.)

,, *Educate away.*—Remove by means of education.

,, *Fatal.*—Ruinous

, *Redundance.*—Superabundance of female intellect (This passage must be understood ironically.)

,, *Sublunary.*—(L. *sub* under, and *luna* the moon; under the moon) Belonging to the earth.

.27 *Enhanced.*—Increased.

,, *Every increase of knowledge.*—Every additional amount of knowledge.

Page.

127. *Alkalis and angles.*—(Alkalis are salts soluble in water and that neutralize acids, and angles refer to mathematical figures.) Chemistry and Mathematics. (Synecdoche)

,, *Philology.*—(Gr. *philos* loving, and *logos* a word. Fondness for words.) The study of words.

,, *Prodigious.*—Wonderfully great.

,, *This advantage.*—The advantage of being well educated. ,,

,, *Fecundity.*—Fruitfulness.

,, *Copiousness.*—(L. *copia* plenty.) Plentifulness, fulness.

,, *Plentifulness*—Fulness.

,, *Images.*—(Metaphor.)

,, *Decorates.*—Gives ornaments to.

,, *Trifling.*—Talking or writing lightly.

,, *The subjects, &c.*—It may not be necessary that the educated man should always be conversing upon those particular subjects that he has studied.

,, *Faculties.*—Powers of mind.

,, *A spirit of dissipation*—A desire for wasting time and strength in profitless amusements.

,, *Diffusing.*—Spreading abroad.

,, *Of sufficient, &c.*—Something of sufficient.

,, *Their nature faculties.*—Their powers of mind when those powers have ripened (mature) ; that is to say, when they have become women.

,, *Formidable.*—That which is to be dreaded.

,, *A host of invectives.*—Any number of censures. (Invective comes from the verb to inveigh, that is, to bring against.)

,, *Not to gratify.*—Not in order to gratify.

,, *On account of what it 'excludes.*—On account of what drink keeps out, *viz.* cares.

Page.

127. *Something worse.*—Cares or anxious thoughts, which he regards as worse than the bad wine.

,, *Though it were denied.*—(Subjunctive, hypothetical.)

,, *Serious knowledge*—In contradistinction to "mere accomplishments," as already explained.

,, *Pernicious*—Injurious.

,. *Works of imagination.*—Books that deal with imaginary incidents. Books of fiction, such as novels.

,, *Trash.*—Worthless stuff.

,, *In lieu of.*—In place of.

,, *Eagerness.*—(Fr. *aigre*, sharp.) Strong desire

., *Temperament.*—Habit.

128. *Vicissitudes.*—Changes.

,, *Nor comprehend*—Nor can we comprehend, or understand.

,, *Take a common interest.*—Feel the same interest.

,, *The respect and importance, &c.*—The respect and importance which old men have, who possess knowledge.

,,* *Venerable.*—Worthy to be revered.

,, *If they outlive their faculties.*—If they continue to live even after their faculties have decayed.

,, *Frame.*—Body.

,, *For what it once contained.*—For the strong educated mind which once dwelt in it.

,, *Hazard.*—Risk.

,, *Upon one cast of the die.*—(Parse "cast" as a noun, meaning a throw. A "die" is a small cube used in gaming by being thrown from a box.) Upon one chance. . (The meaning is, that if woman had proper intellectual training, she would have her education as an additional reason why the man who married her should continue to admire her. As it is, her only means of winning the admiration of a man is her personal appearance ; so that,

when her beauty fades, as it must, with time, she loses the one means by which to keep her husband attached to her.

128. *Commiseration.*—Pity.

    ,, *Decayed accomplishments.*— Accomplishments (as explained above) which have been forgotten for want of practice.

    ,, *Last memorial*—The last token by which they might be remembered.

    ,, *Vestiges.*—Traces.

    ,, *There is no connection, &c.*—That is, the preservation of moral and religious principle does not depend on ignorance. Ignorance is not necessary to keep up moral and religious principle among women.

    ,, *Vague.*—Uncertain.

    ,, *Indefinite.*—Indistinct.

    ,, *Propagation.*—Spread.

    ,, *Impenstrable.*—That which cannot be penetrated or entered into.

    ,, *Obscurity.*—Darkness.

    ,, *Moral rules.*—Rules of morality.

    , *Species.*—Kind.

    ,, *Delusion.*—Deceit.

    ,, *Imposture.*—Cheat.

    ,, *Detection.*—Finding out.

    ,, *Fatal.*—Deadly.

    ,, *To concur in.*—To agree to. (L. *con* with, and *curro* to run.

    ,, *Salutary.*—(L. *salus* healthy.) Healthy

    ,, *Productive.*—Are productive.

    ,, *Sensible of.*—Aware of.

129. *Comprehension.*—Power of taking in, *i. e.*, understanding the whole of any matter.

    ,, *Exclaiming against.*—Denouncing

Page.
129. *Abuses.*—Wrong or improper uses.

,, *Incendiaries.*—(L. *incendo* to set fire to.) People who set fire to buildings.

,, *Libels.*—(L. *libellus* a little book.) Anything written with the intention of injuring the character of a person.

,, *Render depravity, &c.*—Increase the wickedness of the heart already wicked.

,, *Application.*—Use.

,. *Trust.*—(Parse as a verb.) Rely upon.

,. *Operates.*—Works, shows its effects.

,, *Infusing.*—Instilling into the minds of young people.

,, *Giving the power.*—While he gives the power.

., *Rational.*—Reasonable.

,, *Propensity.*—Mental tendency or disposition.

,, *A more useful propensity.*—A tendency to turn his powers and knowledge to useful account.

,, *Disposition.*—(Governed by the preposition " with" understood.

,, *Cultivated.*—Trained and developed.

,, *Associations, &c.*—Ideas which connect his mind with higher subjects.

,, *Recapitulate.*—(L. *re* again, and *capitulum* from *caput* the head) To go over the heads or leading points in a discourse or dissertation.

,, *Insisted.*—Dwelt.

,, *Lavished.*—Wasted.

,, *The affectation charged upon female knowledge.*—The affectation which, it is sometimes said, women show when they feel that they possess more knowledge than it is usual for women to possess.

,, *The economy devolved upon woman.*—The economy, or carefulness, in respect of household expenditure, the burden of which is put upon women.

Page.

129.   *Secured* —Ensured.

,,   *By the ruin, &c.*—By the knowledge of the ruin, &c.

,, .   *Which is productive of the greatest part.*—Which is
        the source of the greatest part.

,,   *Modifications.*—Changes.

,, .   *Dignified.*—Grave, exalted.

,,   *Medicating.*—(Literally, putting medicine into.)   Im-
        proving the character of.

,, .   *Are quite derisive of character and genius.*—Which
        altogether determine or help to fix the character
        and mental tastes of children.

130   *To be instructed.*—To be well informed.

,,   *The stock of national talents* —The aggregate amount
        of mental power there is in a nation.

,,   *A common interest.*— An interest common to both
        sexes.

,,   *An intercourse of understanding* —A state in which
        the understanding of the man and the understand
        ing of the woman exchange thoughts and ideas.

,,   *Intercourse of affection*—A state in which there is an
        exchange of affection or love.

,, -   *Favours public morals* —Helps to promote morality
        generally

,,   *It provides for every season of life.*—A well instruct-
        ed wife will command the esteem and admiration
        of her husband not only when she is young, but
        when she has grown old. (By " season of life"
        is meant "stage of life.")

,,   *As well as for the brightest and the best*—season.
        As well as for the time of youth.

,,   *Stricken by the hand of time.*—(Metaphor.)   Grown
        old.

,,   *With the full power.*—Leaves her with the full power.

,,   *Diffusing.*—Leaves her diffusing.

,,   - *Polite literature.* --Refined literature.   (" Polite"
        comes from the Gr *polis* a city, and it comes to

mean refined from the idea that people living in cities are more refined in their manners than those who live in the country.)

130. *Just.*—Fair, proper to be given.

Homage.—Honor, respect. (This word comes from the Latin *homo* a man · In the old feudal times a man promised service to his feudal lord in the following words, 'homo vester devenio," I become your man. Hence "homage," after coming to mean fealty, service, has come to be used in the sense in which it is used here—honor, respect)

SCOTT.

Sir Walter Scott was born in 1771. His earlier years were spent on his grandfather's farm where he became acquainted with the old ballads, which took such hold of his imagination that, when he was sent to school at Edinburgh, a good deal of his time used to be spent in reading Scottish ballad poetry. He was brought up to be a lawyer, but having been appointed Sheriff of Selkirk, he devoted his time to literature His poems are "The Minstrelsy of the Scottish Borders," "Marmion," "The Lay of the Last Minstrel," "The Lady of the Lake," and "Rokeby." But he will be chiefly remembered as the author of the "Waverly Novels." He died in 1832.

130. *Novelist*—A man who writes novels. (The word " novel" comes from the Latin *novus*, new, applied to a fictitious tale, because the incidents being all fictitious, never had any existence before)

,, *Historical novel.*—A novel, the characters and main incidents of which are taken from History, and which are real.

,, *The " Approach of a Storm."*—"The Antiquary" from which this extract is taken, is one of a series of novels which followed "Waverley," and which are known as the Waverley novels.

,, *Disk.*—(Literally, a quoit,) The round face of the sun.

,, *Level ocean.*—Smooth surface of the sea.

,, *Gilded.*—Lighted up with a golden colour.

Page.

130. *Accumulation.*—Heap.

" *Towering.*—High.

" *The livelong day.*—The whole day.

" *Like misfortunes, &c.*—(Figure of simile.)

" *Dying.*—In allusion to the sun being about to set.

" *Sombre.*—Dark, gloomy.

" *Magnificence.*—Grand appearance.

" *Vapours.*—Clouds; so called because they are an accumulation of vapour.

" *Their unsubstantial gloom*—The dark appearance of the clouds, which, however, had no solid existence.

" *The show.*—The appearance.

" *Pyramids.*—(Gr. *pyr* a flame.) The pyramids, or great monuments of Egypt, are so called, because of their shape, which resembles a flame of fire.

" *Touched with gold.*—Having slightly the color of gold.

" *Stretched*—(Participle.) Lying, spread out

" *Varied.*—Having various figures and colors depicted on it.

" *Gorgeous.*—Of rich colouring.

" *Canopy.*—Covering the sky.

" *Portentously.*—Threateningly.

" *Still.*—(Adjective.) Quiet.

" *Reflecting.*—Throwing back.

" *Level beams.*—The rays of the sun are described as level, because they were, owing to the sun being so close to the western horizon, on a level with the sea.

" *The descending luminary.*— (L. *lumen* a light.) The setting sun.

131. *That imperceptibly.*—"That" has for its antecedent "tide."

" *Imperceptibly.*—In a way so as not to be perceived.

Page.

131. *Gained upon the sand.*—Covered the sand.

., *Romantic.*—Wild, fantastic.

,, *On some.*—Employed on some.

.. *Agitating.*—Exciting.

., *Miss Wardour.*—One of the characters in " The Antiquary."

,, *Advanced &c.*—Walked along by her father's side, without speaking.

., *Offended dignity.*—Feeling that he had been treated with disrespect.

,, *Following.*—Going along.

., *Precipices.*—Perpendicular rocks.

,, *That iron-bound coast.*—The coast of Scotland, called iron-bound because it is surrounded with rocks, and presents a strong, rugged appearance.

,, *Long projecting.*—Jutting out far.

,, *Reef*—A range of rocks lying along the sea.

,, *Evincing.*—Declaring.

,, *Peak.*—Summit.

,, *Breakers*—(This word properly means, the rocks which break the waves. It has, however, come also to denote the waves that break against the rocks. This is its meaning here.)

,, *Foamed over.*—Dashed over in foam.

,, *Beach*—Low, sandy shore.

,: *Crevices.*—Cracks in the rock.

,, *Seafowl.*—Sea birds.

,, *Dizzy height*—Very great height. Height so great as to make one dizzy, *i. e.*, make one feel his head turn.

,, *Rapacity.*—Fondness for plunder.

,, *Wild tribes.*—Varieties of wild birds.

,, *Instinct.*—Natural knowledge.

Page.

131. *Sends them.*—Induces them.

,, *Winging.*—Flying

,. *Dissonant.*—(L. *dis,* and *sono* to sound.)   Discordant.

., *Clang.*—Noisy shrieks.

,. *Announces disquietude.*—Tells that they have been disturbed.

,, *Obscured.*—Darkened, hidden.

,, *Ere*—Before.

., *Early*—Before the proper time.

,, *Lurid.*—Ghastly, pale.

,, *Blotted.*—Put out.

,, *Twilight.*—(From the Saxon *twegen* two, and *light* light)   The uncertain light that in northern countries prevails for several hours during summer between sunset and sunrise.

,, *Moaning.*—Groaning.

,, *The bosom*—The surface.

,, *Ridges.*—Waves.

,, *Furrows*—The hollows between two waves.

,, *The breakers*—The rocks against which the waves broke themselves.

A Forest Scene in England in the reign of Richard I.

131. *Richard I.*—Surnamed, the Lion-hearted, ascended the throne of England in 1189.   He greatly distinguished himself in the crusades against the Saracens.   Died 1199.

,, *Don.*—A river in Yorkshire, which takes its rise in the moors near Penniston.

,, *Sheffield.*—A town in the West Riding of Yorkshire, at the confluence of the rivers Sheaf and Don.

Page.

131. *Doncaster.*—A town in the West Riding of York-
shire. (It was an old Roman encampment. The
word "caster" means camp; and Don-caster was
the camp on the banks of the Don.)

132. *Seats* —Residences of noblemen.

,, *Rotherham.*—A manufacturing town in the West
Riding of Yorkshire.

,, *Here.*—(Properly an adverb, meaning, in this place.)
In this passage, however, the word means, this
place, and it may be regarded as the object of the
predicate "haunted." The dragon haunted this
place

,, *Haunted.*—Frequented

,, *Civil War of the Roses.*—The war between the
supporters of Henry VI of the House of Lancas-
ter, and those of Edward Duke of York. The con-
test between these two houses lasted from 1455 to
1461. The red rose was used as the emblem of
the Lancastrian, and the white rose of the York-
ist party.

,, *Outlaws.*—Men who, for crimes committed, were
deprived of the protection of the law.

,, *His long captivity* —Richard, on his return from
Palestine, was travelling through Germany, when
Leopold, Duke of Austria, made him a prisoner
and sent him to the Emperor Henry VI, who con-
fined him in a castle in the Tyrol It was a long
time before the English people knew where he
was.

,, *Despairing.*—Hopeless of finding their king.

,, *Subordinate oppression.*—Unjust and cruel treatment
at the hands of subordinate officers of the State,
who did as they liked in the absence of the king.

,, *Exorbitant.*—Excessive.

,, *Stephen*—Became king of England in 1153.

,, *Henry* II.—The first of the Plantagenets. He was
crowned in 1154.

Page.

132. *Resumed* —Begun again.

,, *Ancient license.* —The lawless freedom from restraint which they enjoyed from past generations.

,, *The English Council of State* —A body of men who were appointed to govern the country, in the absence of king Richard I.

,, *Vassalage.*—Slavery.

,, *Forces.*—Army.

,, *To make a figure.*—To take a prominent part.

,, *National convulsions.*—Revolutionary disorder among the people.

,, *Impending.*—Hanging overhead, threatening.

,, *Inferior.*—Lower class.

,, *Gentry* —The class of people between the nobility and the common people.

,, *Franklins.*—English freeholders.

,, *Constitution.*—Established rules and principles of Government.

,, *Feudal tyranny.*—The tyranny exercised by the feudal lords over their vassals

,, *Precarious.*—Uncertain.

,, *Petty kings.*—Feudal barons, each of whom was practically a king within his own lands.

,, *Vicinity.*—Neighbourhood.

,, *Accepted feudal offices.*—Agreed to serve the feudal barons.

,, *His household* —The antecedent of the pronoun " his " is " any of the petty kings."

,, *His enterprises.*—Whatever he undertook, whether against other barons, or in opposition to lawful authority.

,, *Temporary repose.*—Rest and quiet for a little time.

,, *English bosom.*—(Synecdoche.) Englishmen.

,, *Expedition.*—Enterprise, undertaking.

Page.

132. *Their protection.*—The baron under whom they had taken office ; they agreeing to serve him in consideration of his protecting them and their concerns.

,, *Multiplied.*—Numerous.

,, *The Barons.*—These were Norman Barons, who had come over to England with William the Conqueror, among whom the lands were partitioned, each becoming a feudal lord within his own lands, and giving room and protection to all those who agreed in return to give him military service whenever called upon to do so

,, *Pretext.*—An excuse.

,, *Separate themselves, &c.*—Become independent.

,, *Inoffensive conduct.*—Abstaining from conduct likely to give offence.

,, *Enhance.*—Increase.

,, *Duke William of Normandy.*—This was William the Conqueror who, coming over from Normandy, defeated King Harold at the battle of Hastings, and became king of England.

133 *Blend*—Mix.

,, *Blend the hostile blood, &c*—The Anglo-Saxons who had been the ruling race in England till they were overcome by William of Normandy, for a long time remained enemies to the Norman race, who now settled in England as the ruling race. The two races held little intercourse with one another, and there were no intermarriages between them (blending hostile blood, *i. e.*, the blood of the Norman with that of the Anglo-Saxon,) for four generations after the conquest. Not only were there no intermarriages, but they did not care to learn one another's language, or to have such business dealings as would have produced mutual benefit.

Elation.—Proud joy.

One of which.—The Normans.

The others.—The Anglo-Saxon.

Page.

13?. *The Battle of Hastings*—This was the battle at Hastings in the county of Sussex, at which William of Normandy defeated King Harold, and which made him king of England in 1066.

„ *With no moderate hand.*—Not with moderation, *i e,* immoderately, excessively.

„ *Extirpated.*—(L. *ex.* out of, and *stirps* a root.) Rooted out.

„ *Nor were the numbers great who.*—Nor were the numbers great of those who ; *i e.,* nor were there many who

„ *The royal policy*—The policy or principle on which the king acted.

„ *A part of the population.*—The Anglo-Saxons

„ *Inveterate*—(L. *in* and *vetus* .) Of old standing hence, firmly established.

„ *Antipathy.* —Hatred.

„ *Their victor.*—The Norman.

„ *Predilection.*—Liking for.

„ *The laws of the chase.*—The laws relating to hunting in the forests. These were very severe against those who killed the animals in the forests which were supposed to belong to the Crown exclusively. In the early times to kill a deer in one of the king's forests was as penal as to kill a man.

„ *Saxon constitution.*—The Saxon laws of government.

„ *Had been fixed upon the necks of.*—Had been imposed upon (The allusion is to the yoke placed upon the necks of oxen.)

„ *Subjugated.*—(L *sub* under, and *jugum* a yoke. The Romans used to make a conquered people pass under a wooden construction in the shape of yoke, in token of their subjection.) Subdued.

„ *Feudal chains.*—Their state of vassalage under the feudal barons.

„ *State.*—(L. *stod* to stand.) Magnificent display.

Page.

133. *Emulated.*—Imitated, copied; to imitate with a view to equal, to excel.

,, *The language.*—The language spoken by men of rank, by military men, and the language of the courts of justice.

,, *More manly.*—More becoming men, in contradistinction to women.

,, *Abandoned to the use of.*—Left to be used by.

,, *Rustics.*—Villages.

,, *Hinds.*—Domestic or farm-servants.

,, *Lords of the soil.*—Lords of the land: the Norman Barons.

,, *Dialect*—(Gr. *dia* through, and *lego* to speak. A speaking across.) Any peculiar form of a language

,, *Compounded betwixt*—Made up of a mixture of.

,, *The victors and the vanquished.*—The Norman and the Saxon.

,, *Richly*—Greatly.

,, *Importations.*—(L. *im* or *in* into, and *porto* to carry.) Words brought into the English language.

,, *The classical languages.*—The Greek and Latin.

,, *Premise.*—State at the onset. (Pronounce the verb, as here, with the *i* long—premise.

,, *Insurrection*—Revolt among the people themselves.

34. *Reduced.*—Brought down to.

,, *Down.*—(Down is not to be parsed as an adverb qualifying "continued," but as part of the adverbial clause "down to the time of Edward III;" the entire clause qualifying the verb.

,, *Edward III*—Born 1312, died 1377. He defeated both the Scotch and French.

,, *Keep open the wounds.* Preserve the bitter and angry feelings.

,, *Maintain a time of separation.*—Keep up a separation.

Page.

134. *Glades.*—An open space in a forest.

  ,,   *Stately* —Dignified.

  ,,   *The Roman soldiery.*—The allusion is to the time when the Romans occupied Britain and had a military encampment in the neighbourhood of this forest.

  ,,   *Which had witnessed, &c.*—The meaning is, that probably the Roman soldiers in the olden times marched through this forest.

  ,,   *Flung, &c* —Threw out their knotty branches. (Metaphor.)

  ,,   *Carpet.*—The thick and close green grass of the glade.

  ,,   *Greensward.*—The green grass.

  ,,   *Beeches, hollies and copsewood.*—Kinds of trees.

  ,,   *Intercept* —(L. *inter* between, and *capio* to take. To take a thing by coming between. Intercept.)

  ,,   *Sinking* —Setting.

  ,,   *Receded.*—Stood at a greater distance from one another.

  ,,   *Sweeping vistas.*— Extensive views

  ,,   *The eye delights to lose itself.* —People like to look and yet find that they cannot see through the entanglement of trees and branches.

  ,,   *Sylvan solitude* —The feeling of loneliness in a wood. (L. *sylva* a wood.)

  ,,   *Shot.*—Sent forth.

  ,,   *Shattered.*—Broken.

  ,,   *Mossy trunks.*—Trunks of trees overgrown with moss.

  ,,   *Illuminated.*—(L. *lumen* a light.) Lighted up.

  ,,   *Turf.*—Grass.

  ,,   *Druidical superstition.*—The Druids were the priests of the ancient Britons. They taught astrology and practised divination and magic.

  ,,   *Artificial.*—Artificially made.

Page.

134. *Some convert to Christianity.*—Some one who, having become a Christian, thought it was his duty to pull down every thing that was intended for purposes of idolatrous worship.

,, *To the bottom.*—To the bottom of the hill.

,, *The course.*—The flow.

,, *The foot.*—The bottom, or base.

,, *Eminence.*—Hill.

,, *By its opposition.*—The stone lying in the way of the brook opposed the flow of the water, which, owing to this obstacle, gave forth a murmuring sound.

,, *Placid.*—Smooth, peaceful.

,, *Elsewhere.*—In other places.

,, *The human figures*—The men.

,, *Completed the landscape*—Formed part of the scenery, and were necessary to be mentioned in order to make the description complete.

,, *Woodlands.*—Forests.

,, *A close jacket.*—A jacket fitting closely to the body.

,, *Tanned.*—Converted into leather.

,, *The fur.*—The hair.

,, *Primeval*—(L. *primus* earliest, and *ævum* an age. Belonging to the first or earliest age.) Very old style of garment.

135. *The collar.*—The part that goes round the neck.

,, *Hauberk.*—(Fr. *haubergeon*.) A coat of ringed mail, worn as defensive armour.

,, *Sandals.*—A shoe consisting of a wooden sole secured to the foot by means of straps.

,, *Thongs.*—Thin strips of leather.

,, *Calf.*—The thick fleshy part of the leg behind.

,, *Gathered.*—Bound round.

,, *Scrip.*—A little bag for putting in scraps.

50

Page.

135. *Accoutred.*—(Pronounce *accooterd*) Literally, dressed. Provided with.

,, *Fabricated.*—(L. *faber,* a worker in hard materials.) Made.

,, *Even at this early period*—Note here the force of the word "even." The town of Sheffield in Yorkshire has been celebrated for a long time, and is celebrated now, for its superior cutlery. The firm of "Rogers and Sons" is a Sheffield firm. But what Scott notes as remarkable is, that even at that early time of which he was writing, Sheffield must have been noted for its manufactures in the way of knives.

,. *Whittles*—Small pocket knives.

,, *Matted.*—Interlaced; that is to say, not combed out.

,, *Overgrown.*—Grown to too great a size.

., *Amber.*—(Amber is a fossil resin of a light yellow colour.) Light yellow. (Parse as an adjective.)

,, *Suppressed.*—Omitted in the description.

,. *Soldered.*—Joined together by a metallic cement.

. *Impediment.*—Hindrance.

,, *The file.*—A steel instrument with sharp-edged furrows, used for smoothing down or rasping metals.

., *Gorget.*—(Literally, armour for the throat) Necklet.

,, *Gurth.*—This was the name of the man.

,, *Thrall.*—A slave. (Hence our word "thraldom," a condition of bondage, or slavery.)

,, *Swineherd.*—A man whose business it was to tend swine.

,, *Monuments.*—Stones above referred to.

,, *Fantastic.*—Fanciful.

., *Stained.*—Coloured, dyed.

135.   *Grotesque.*—Ludicrous.

"   *Longitude.*—Length.

"   *Drapery.*—Cloth, or a garment having a flowing
        appearance.

"   *With his companion* —As his companion.

136.   *Gaiters.*—A cloth covering for the leg and the upper
        part of the foot, reaching to the shoe.

"   *Those attached to hawks.*—In the times referred to,
        and for many years later, hawks used to be
        trained to hunt other birds, and were commonly
        carried on the hand. As pet birds they used to
        have bells and other ornaments put on them.

"   *Bandeau* —(Pronounce *bando.*) Band.

"   *Coronet.*—The diminutive of crown.

"   *Hussar* —A light-armed cavalry soldier.

"   *Half-crazed.*—Half-foolish.

"   *Domestic clowns, or jesters.*—It was common in the
        old times for kings and other men of rank to keep
        in their employ men whose profession it was to
        amuse the company by their jests or jokes.

"   *To help away.*—To help to pass away.

"   *Tedium* —Weariness.

"   *Edge-tools.*—Tools that have an edge, and can cut.

"   *Equipped.*—(Literally, fitted out, as a ship for sea.)
        Provided.

"   *Lath* —A thin slip of wood.

"   *Harlequin.*—The name given to the clown in a pan-
        tomime.

"   *Scarce.*—(Adverb.) Scarcely

"   *Dejection* —Sadness of mind.

"   *Construed into* —Understood to be.

"   *Slumbered.*—Existed, though not in an active state.

"   *His class.*—Clowns' or jesters'.

"   *Vacant.*—Showing no signs of intelligence.

Page.

136. *Any posture of repose.*—Any one position in which he could remain quietly for any length of time.

" *In the original.*—(Parse " original" as an adjective qualifying the noun "language" understood.) The Anglo-Saxon.

137. *The curse, &c.*—Elliptical for, "may the curse of St. Withold rest, &c."

" *Porket.*—Swine.

" *Obstreperously.*—Noisily.

" *Notes*—Sounds.

" *Beechmast*—The nuts, produced by the beech-tree

" *Acorns.*—The berries produced by the oak.

" *Fattened.*—(Intransitive verb) Had grown

" *The two-legged wolf.*—Some man bent on stealing

" *Lurcher.*—A kind of dog used for securing game.

" *Mastiff.*—A house-dog, used as watch dog

" *Refractory*—Disobedient.

" *Grunters.*—Pigs, so called from their grunting.

" *Malice prepense.*—Malice afore-thought Intentionally

" *Increased the cri'*—Scattered the pigs more.

" *A devil, &c.*—May a devil draw his teeth.

" *The Ranger of the forest.*—One of the several kinds of officers appointed to take care of the royal forests. His duty was to go about to see that no injury was done to the king's deer, to the greensward and to the covert in which the deer were lodged.

" *That cuts the foreclaws, &c.*—There was a forest law that every third year the claws and ball of the forefeet of mastiffs should be cut off to prevent them from running after the deer. The law had reference to mastiffs only, because they were the only dogs that were allowed to be kept within a forest. This process was called lawing.

(113)

137.   *Unfit for their trade.—*Unfit to go after the herds of
          porkers and keep them together.

  ,,   *An thou beest a man.—*If thou art a man.

  ,,   *To gain the wind on them*—To be towards them in
          the direction in which the wind is blowing.

  ..   *Weather-gauge, &c.—*When you have got to wind
          ward of them.

  ,,   *Sloughs.—*Marshes.

  .,   *My sovereign person.—* This is said in joke. (Parse
          "sovereign" as an adjective.) Wamba pretends
          to be a king and to have on royal attire.

  .,   *Conceited into Normans*—Turned into Normans.
          (This is explained further on.)

  .,   *Pork.—* The pigs become Norman in the sense of
          their flesh, when it is prepared for food, getting
          a Norman name. (The same thing that is here
          said of sow and pork, is true of other animals:
          thus "sheep" is Saxon; but when the animal
          is killed, the flesh is called mutton (Norman
          mouton, a sheep) So " cow " is Saxon; but when
          the animal is killed, its flesh is called beef (Nor-
          man *boeuf,* a cow.)

138.   *Doctrine.—*Teaching.

  ,,   *Pate.—*Head.

  ,,   *Alderman.—*(Literally elder man.) The Magistrate
          of a town. (The word is here applied playfully
          to the ox on account of its size; aldermen having
          the reputation of being big, stout men.)

  ,,   *Gallant.—*A man of fashion.

  ,,   *Arrives before, &c.—*Is placed on the nobleman's
          table by whom it is to be eaten.

  ,,   *Mynheer.—*(Dutch Mister.)   Written Mr.

  ,,   *Monsieur*—(Norman-French.)   Mr.

  ,,   *DeVeau.—*(Fr. of a calf.)   Veal.

  ,,   *Tendance.—*Looking after, feeding.

Page.

138. *Matter of enjoyment.*—Food.

,, *St. Dunstan.*—He was born at Glastonbury, of which monastery he became abbot, and he died Archbishop of Canterbury in 988. The legend about him is that when, as a goldsmith, he was making a chalice, the devil appeared to him, whereupon St. Dunstan seized him by the nose with a pair of iron tongs.

,, *Solely for the purpose. &c*—That is, we are allowed to breathe merely, because it is so that we are able to serve our Norman masters.

,, *Finest and fattest.*—Animals.

,, *Loveliest.*—Women.

,, *Best and bravest.*—Men.

,, *Foreign masters*—Normans.

,, *Whiten, &c.*—Die on the battle-field, and their bones are left to get white in the sun.

,, *God's blessing.*—May God's blessing be.

,, *Cedric*—Gurth's master. He was a Franklin.

,, *Reginald Front-de-Bœuf* and *Philip Malvoisin*—Were Norman chiefs, characters introduced into the story of Ivanhoe.

,, *Soho !*—Exclamation for the encouragement of the dog.

,, *Putting thy head into my mouth.*—Putting thy life in my power, so that a word from my mouth would procure thy death.

,, *One word to, &c.*—I have but to speak one word, &c.

,, *Cast away.*—Despised, uncared for.

,, *Waver.*—Swing, *i. e.*, be hanged.

,, *A terror.*—Something to frighten others ; a warning.

,, *Evil speakers*—(Parse "evil" as a noun governed by the verb "speak.") Speakers of evil.

,, *Dignities.*—(Dignitaries.) People in power. (L. *dignus*, worthy)

Page.

138. *Dog* —Epithet addressed to Wamba.

    „   *At disadvantage.*—In ignorance that I was speaking to one who might betray me.

    „   *Soft.*—Speaking softly.

139. *Fairy laird* —King Oberon, who was king of the elves or fairies.

    „   *A murrain take thee.*—May a murrain take thee.

    „   *Murrain.*—A fatal disease.

    „   *Play the rational* —Pretend to be very reasonable and sensible.

    „   *Let us home.*—Let us go home.

    „   *Quarter-staff* —A long staff for defence called a quarter-staff, because it was usually held at a quarter of its length from the end.

    „   *Eumæus.*—The ancient Eumæus was the faithful swineherd of Ulysses. His father was king of the island of Syrie He had been carried away from his father's house by a Phenician slave, and was sold to Ulysses, king of Ithaca.

    „   *His inharmonious charge.*—The herd of swine. The swine were his charge, because he had the care of them, and they are called " inharmonious " because of the discordant grunting they kept up as they went along.

    [*See page* 132.—There is an old English ballad which gives an amusing account of the manner in which the Dragon of Wantley was killed by More of More-hall. The dragon is represented as having two huge wings, a tail with a sting in it, long claws, and forty-four iron teeth. He is said to have devoured three children, besides all sorts of animals, trees, houses, and churches. More of More-hall having determined to fight the dragon, armed himself with armour covered all over with long steel spikes. So armed, he crept down into a well to which he knew the dragon would come to drink, and as the dragon was drink-

ing, More kicked him in the mouth, and wounded him in the throat, which was the only part in which the dragon was vulnerable.   The dragon rolled over and died.]

How Scotland and England came to be separate Kingdoms.

139.   *Moor.*—An extensive piece of waste land covered with heath.

Quarries.—Places where stones are dug out for building purposes.

140   *Large and stormy seas.*—The English Channel, the Irish Channel, Atlantic Ocean, and the German Ocean.

The King of Scotland, &c.—On the death of Queen Elizabeth, James VI. of Scotland, being next heir to the throne of England, became king of England under the title of James I.

As became.—As was proper for.

The Romans—The people of Rome in Italy, who reared the most extensive empire of the old world.

Far and near.—Distant countries and near countries.

They came to Britain.—They came under the leadership of Julius Cæsar.

Impenetrable country.—Country which could not be penetrated or entered.

Picts.—A tribe dwelling in Scotland, so called by the Romans because they were in the habit of painting themselves.

At the least alarm.—At the slightest notice or sign of the coming.

The Frith of the Clyde and the Forth.—Rivers in Scotland.   The Frith of the Clyde falls into the Irish Channel.   The Frith of Forth falls into the North Sea.

Dike.—Wall.

Page.

140 *Barbarians.*—(This word was first applied by the Greeks to all people who spoke a different language from themselves. It then came to mean, people who were uncivilized and without refinement.) The Picts and Scots, whom the Romans called barbarians.

,, *The Romans.*—Case absolute.

,, *They lost.*—The Britons lost.

,, *Civil wars.*—(The Romans occupied Britain for about 400 years, and they then retired, owing to the need of soldiers in Rome itself, to protect the Imperial power.) A civil war is a war between the people and the authority of the State.

142. *Took to their ships.*—Went on board their ships.

., *Hoisted,*—Plundered.

,, *The Anglo-Saxon*—The section of Germany from which the Angles or English and Saxons came is Sleswick, a district in the heart of the peninsula that parts the Baltic from the North Sea.

,, *Fastnesses*—Mountain barriers.

,, *Wales.*—Province in the west of England.

143. *Got the better of the Picts*—Subdued the Picts.

., *As straight as an arrow.*—Figure of simile.

., *Bogs.*—Marshes.

,, *Heaths*—Tracts of open, barren country.

,, *Though they tried it.*—The antecedent of " it " is " to become masters of Scotland."

,, *The finest land that the sun shines upon*—(The sun shines upon all lands. The phrase is, therefore, equivalent to) The finest land in the world.

,, *Oatmeal.*—(The word *oat* literally means, that which may be eaten; oats are the seed of a grassy plant, and oatmeal is) Oat seeds ground.

,, *Wheaten.*—(Adjective.) Made of wheat.

144. *Or has.*—Or which has.

HEBER.

Reginald Heber, Bishop of Calcutta, was born at Malpas, Cheshire, in 1783. After a brilliant career at College, he composed his prize poem, entitled "Palestine." In 1805, he took a continental tour and visited Russia, the Crimea, Hungary, Austria, &c. He took Holy Orders in 1807 Wrote for the "Quaterlv Review" for some years, and worked at a Dictionary of the Bible, which, however, was never finished. He had, for a long time, considered that devotional poetry stood in need of improvement, and, with a view to raising its standard, he composed a volume of "Poems and Translations for Weekly Church service." In 1819, he edited Jeremy Taylor's works, and, in 1822, was made preacher of Lincoln's Inn. In June 1822, he was ordained Bishop of Calcutta, after twice refusing the appointment. In June 1824, he began the visitation of his diocese, which in his time extended over the whole of India, Ceylon, and Australasia. He travelled through Bengal, and after an eleven months' journey, arrived at Bombay, sleeping for the most of the time in a tent or cabin. He wrote a journal describing with great clearness and picturesqueness the strange provinces he visited, and giving detailed accounts of the manners and customs of the natives of India. After a visit to Ceylon, he left Calcutta on a journey to Madras, and reached Trichinopoly, where, after confirming a number of natives, he retired to take a cold bath in which he was found dead soon afterwards. He died in 1826.

178. *Spectacle.*—(L. *specto* to see.) Something to be seen. (Glasses worn on the face to aid the sight are called "spectacles;" that is to say, it is the plural number that is used. We never say "a spectacle" when we mean a pair of such glasses, but always "spectacles." In the singular number a spectacle means something to be seen or gazed at.)

„ *To drive a nail*—To hammer a nail in.

„ *Ram i.*—(An Indian monarch.) One of the gods of Hindu mythology.

„ *Sita.*—Rama's wife.

„ *All the world.*—Every body in the place.

„ *Ramayana festival.*—The festival at which the exploits of Rama, as detailed in the great Indian epic The Ramayana, are dramatized. One of the main features of this epic is the description it contains of the great war between Rama and Ravana, the demon monarch of Ceylon, who had carried away

Page.

Rama's wife, Sita. Rama had to cross the channel that divided the continent from the island of Ceylon, and he was aided in this enterprise by the monkey-general Nalu who got his thousands of monkeys to build a bridge across, which they did by tearing up rocks and trees, and throwing them into the water. The war ended with the death of Ravana and the recovery of Sita.

178. *Dramatic representation* —The acting out of a thing in the form of a drama

,, *Adventures.*—The feats that Rama performed, and the events that happened to him.

,, *For such it is now considered.*—This parenthetical clause implies that there was a time when this dramatic representation was not intended as a show, but as a religious performance.

,, *Seated in Durbar.*—Seated as if holding a levee

,, *Sepoy lines.*—The cantonments occupied by native troops,

,, *Rang again.*—Re-echoed the sound.

,, *Tinsel.*—Cloth overlaid with a thin coating of gold or silver.

179. *Vermilion.*—Bright red. (This colour received its name from having been taken from an insect, called the cochineal. It is now usually obtained from sulphur and mercury.

,, *Alone.*—Parse this as an adverb qualifying "twinkle" The couplet may be paraphrased thus: Except that, only the twinkle in their eyes showed that they (the three children) were living beings and not made of stone.

,, *Poor little Sita.*—The little girl representing Sita.

,, *Solicitude.*—Anxiety.

,, *Should receive.*—More correctly, "would receive."

,, *Puppet-show.*—Puppet is a small doll used in a show. (The English puppet-shows common at fairs, are

Page.

very much the same thing as the *katpootli* of this country.)

179. *Exterior.*—(Parse as a noun.) Outward appearance.

„ *His destination.*—His being destined or appointed to act as Hanuman.

„ *Greenwood*—Forest.

„ *Hie.*—Go.

„ *Engaged.*—Had something else to do.

„ *The gigantic ravisher*—The ravisher or person who ran away with Sita, was Ravana, the demon-ruler of Ceylon, who is represented as a huge giant, and is thus described in the Ramayana :—" This mighty demon had ten faces, twenty arms, copper-coloured eyes, a huge chest, and bright teeth like the young moon. His form was as a thick cloud or a mountain, or the god of Death with open mouth. He had all the marks of royalty, but his body bore the impress of wounds inflicted by all the divine arms in his warfare with the gods. It was scarred by the thunderbolts of Indra, by the tusks of Indra's elephant Airavata, and by the discus of Vishnu. His strength was so great that he could agitate the seas and split the tops of mountains."

Sate.—Past tense of " sit." The common form is " sat."

Gamboling.—Playing. (Do not confound gambol with *gamble*, the participle of which is *gambling*. This latter word means playing a game of chance for money)

180. *Pageant.*—A show.

Purification.—The story is, that when Sita was brought back to Rama, he refused to take her back, because he thought she must have been contaminated. She, accordingly, had a pyre prepared to prove her purity, and entered the flames, invoking Agni. Having been brought back inside, unhurt by Agni, she was received by her husband. This is the " purification" referred to.

Tiger Shooting.

180. *After three.*—After three o'clock.

" *Coursing party.*—A party going out to see a horse-race.

" *With them, &c.*—Our party had not come out to shoot antelopes.

" *Good for little.*—Of little good, *i. e.*, not very nice.

" *A litte before.*—A little beyond.

" *The tope*—Grove of trees.

" *Skirt it.*—Go round the skirt or border of it.

" *Tracked*—Followed by the marks or signs he had left.

181. *Keeping us as if, &c.*—Remaining in the order in which we would have done if, &c.

" *Beating.*—The jungle.

" *Stag*—A male deer.

" *Palmated.*—Shaped like a palm leaf.

" *Elk.*—The largest species of deer.

" *Unmolested*—Not troubled by any one.

" *Bounds.*—Leaps.

" *Repaid my coming out.*—Gave me sufficient satisfaction for the trouble of coming out.

" *Animation.*—Liveliness.

" *Waving.*—Moving.

" *Horse and foot.*—Men on horse-back and men on foot.

" *To catch the contagion, &c.*—(L. *con* together and *tango* to touch) Contagion is often used to denote a disease transmitted by touch. In this passage, interest and enterprise are likened to a disease which was transmitted to the writer, in consequence of his being in the company of the men who were showing great " interest " and daring (enterprise.)

" *Turn short round.*—Turned suddenly round.

Page.

181. *Post*—Position.

,,   *In the rear of.*—Behind.

,,   *To miss.*—To lose the sight of.

,,   *Sagacious*—Intelligent, wise.

,,   *Close upon.*—Near to.

,,   *Him.*—The tiger.

,,   *Stealing away.*—Moving noiselessly.

,,   *The second barrel.*—This was a double-barrelled gun ; that is to say, a gun with two barrels or tubes through which the bullet is discharged.

,,   *Followed*—The shot.

,,   *The cover.*—The jungle by which the tiger was covered.

182. *Horse and foot.*—(Parse as "adjectives" qualifying "spectators.")

,,   *But its growl, &c.*—Parse "but" as a preposition governing the nouns "growl," "belief," "assertion" and "alarm."

,,   *Had robbed, &c.*—Had prevented Mr. Bou'erson from firing.

,,   *I was quite in rule.*—I acted according to rule.

,,   *Essay.*—Attempt.

,,   *The chace of bubbles, &c.*—As the bubbles on the water mark the direction in which the otter that is being hunted has gone, so the waving of the tall grass in the jungle shows the direction in which the tiger is moving.

,,   *Chace of bubbles.*—Long series of bubbles.

,,   *Otter*—A large kind of weasel that lives entirely in the water.

,,   *Make off*—Go off.

,,   *Broken cover.*—Got out of the jungle that covered or concealed him.

,   *At bay.*—Face to face with an enemy, and so compelled to fight.

Page.
182.   *Its cover.*—The cover or concealment of the jungle.

  ,,   *If they are missed.*—If the shot fired, misses.

  ,,   *Forwards.*—In front.

  ,,   *Woe be to him*—(*i. e.*, to the tiger) Woe is sure
         to befall him.

  ,.   *Thus dealt with*—Thus shaken off.

  ,,   *Both from friends and foes.*—Both from the ele-
         phant and the tiger.

  ,,   *Venemous.*—Poisonous.

  .,   *Out-right.*—Entirely.

             ————

            THE JAIN TEMPLE OF KAIRAH.

  ,.   *Jain*—The Jains, who are to be found for the most
         part in Guzerat and the west coast of Hindoostan
         and especially in South Behar, and indeed almost
         every where in India, represent a system of philo-
         sophy which has grown out of Buddhism. The
         principal point in their system is the reverence to
         "holy men" who have raised themselves by long
         discipline to divine perfection. Such men are
         called "Jinas" or conquering saints. The Jains be-
         lieve that time proceeds in two eternally recurring
         cycles of immense duration. Their idols are
         representations of Jinas. There are two classes
         of Jains · one who take up secular occupations,
         and the other, who are ascetics and live in
         monasteries.

  ,,   *Kairah*—A town in Guzerat.

  ,   *The worst.*—The worst feature of it.

  ,,   *The Terai*—The belt (long tract) of jungle extend-
         ing along the foot of the Himalayas.

  ,,   *Circumstanced.*—Situated.

  ,,   *Fatal.*—Deadly.

  ,,   *Tropical climates.*—Countries situated in the tropics,
         i. e., the countries lying within the tropics of
         Cancer and Capricorn.

Page.
182. *Havoc.*—Damage, destruction, death.

,, *My Hindoostanees, &c.*—Servants.

,, *" The belt of death."*—The Terai above mentioned so called on account of the deadly malaria that prevail's in it.

,, *Alacrity.*—Readiness, quickness.

,, *Felt nothing like indisposition.*—Did not feel at all ill.

,, *Brackish.*—Salt.

,, *Excellent quality.*—Excellent water.

,, *A circumstance.*—(In apposition to " quantity of saltpetre."

,, *The cantonment.*—The military encampment. (Pronounce " *cantoonment.*")

184. *Artillery lines.*—The cantonment occupied by the artillery soldiers.

,, *Bastions.*—Masses of masonry at the angles of a fortification for purposes of defence.

,, *Gable-ends*—The gable is the part of a building between the top of the side wall and the slope of the roof.

,, *Gaudy*—Showy, bright.

,, *Salám.*—Parse as a verb.

,, *Statues of sitting men.*—These were some of the twenty-four Jinas or perfected saints revered by the Jains.

,, *Solitary.*—Single.

,, *Apertures*—Openings.

,, *Flue.*—Chimney or pipe through which smoke escapes.

,, *The vaulting.*—The arched roof of the underground room

185. *Adawlut.*—The Court-house.

,, *Style*—Of architecture.

Page.
185. *Attic story.*—A room in the roof of a house.

,, *Forced.*—Broken open.

,, *Associates.*—Companions.

,, *Apply it to the wound.*—This has reference to the belief, that the body of the scorpion, that inflicts a wound, being rubbed on the wound, will heal the smart.

,, *Patience.*—Bearing of the pain.

,, *Lotion*—A wash.

,, *Occupying, &c.*—Turning away his thoughts from the pain being suffered.

,, *Extremity of their anguish.*—The intensity of the pain.

,, *Centipede.*—(L. *centum* a hundred, and *pes* a foot. Supposed to have a hundred feet.) An insect well known in this country having a great many feet

,, *Divine service.*—Public worship in the church.

,, *Cornelians.*—A kind of pebble.

,, *Mocha-stones.*—A species of agate. They are called mocha-stones because when they were first known in Europe they had been brought from Mocha in Arabia.

,, *Cutch.*—On the north of the province of Guzerat, and separated from it by the Gulf of Cutch.

,, *Cattcywar.*—Also written, Kattewar. In the peninsula of Guzerat.

,, *Emboss.*—To ornament with raised work.

,, *Punching.*—Pressing or stamping in with a steel tool so as to perforate or leave a deep impression.

,, *Tankard.*—A drinking vessel with a lid.

———

IRVING.

WASHINGTON IRVING, a distinguished American author, was born at New York in the year 1783. His father was a Scotch merchant and died while he was still young. He was educated at home by his elder brothers. He commenced writing in 1802, and contributed a number of sketches to the "New York Morning Chronicle" under the title of "Letters of Jonathan Oldstyle." He kept such bad health, however, that he was obliged to travel. He visited France, Switzerland, Italy, Holland and England, and, on his return to New York, commenced, together with Mr. Kirk Paulding, a series of numerous and graphic sketches under the title of "Salmagundi." These were continued till 1807, when he wrote several tales and essays for the newspapers and magazines. About this time he began to study law, and was admitted to the bar, but never practised as a barrister. In 1809, he published the "History of New York." After the war between England and the United States, he went over to England, where he wrote his "Sketch Book." It became so popular, that he wrote a second volume, and two other works, "Bracebridge Hall" and "Tales of a Traveller," which last appeared in 1824. In 1826 he went to Madrid, and, on his return, published the "History of the Life and Voyages of Columbus;" the "Voyages and Discoveries of the Companions of Columbus," the "Conquest of Granada," and "Tales of the Alhambra." In 1829, he was appointed Secretary to the American Legation in London, and about the same time, the Royal Society of Literature gave him one of its gold medals, and the University of Oxford conferred on him the degree of LL.D. In 1832, he returned to America, and soon after published a "Tour on the Prairies," "Astoria," or Enterprise beyond the Rocky Mountains," and the "Adventures of Captain Bonneville." In 1841, he was appointed Minister Plenipotentiary to the Court of Spain, which office he held till 1846. He retired to his estate on the Hudson, where he lived till his death. His last works were, "Chronicles of Woelfert's Roost" and a "Life of Washington." He died at Sunnyside in 1859.

186. *Day-dreaming.*—Give play to one's fancy.

,, *Reveries.*—Fanciful trains of thought.

,, *Then they.*—The antecedent of "they" is "subjects."

,, *The deep.*—(Noun.) The sea.

,, *Worldly themes.*—Subjects on the earth, as distinguished from things above or beneath it.

,, *Quarter-railing.*—The railing on the side of a ship between the stern and the main-mast.

,, *Fairy realms*—Region inhabited by fairies.

,, *People them.*—(Parse "people" as a verb in the infinitive mood governed by "delighted.") To people them in my imagination, *i. e.*, to fancy them peopled.

Page.

186. *A creation of my own.*—People created by my own fancy.

,, *Undulating.*—(L. *unda* a wave.) Waving.

,, *Volumes.*—(L. *volvo to* turn.) Masses.

,, *A delicious sensation, &c.*—A double feeling made up of safety and yet fear, which was very pleasant to have.

,, *Giddy height.*—Height calculated to make one feel giddy.

,, *Monsters.*—Huge fish and other sea animals.

., *Uncouth.*—Awkward.

,, *Shoals.*—Great multitudes of fishes swimming together.

,, *Bow.*—The bent sides of the front of a ship.

,. *Grampus.*—A long voracious fish common in the Arctic seas.

,, *Heaving.*—Lifting up.

,, *Spectre.*—Ghost.

,, *Conjure up.*—Summon up (as if by the use of some sacred name as an incantation)

., *Finny herds.*—The herds of living creatures having fins : that is to say, the large varieties of fish.

,, *Shapeless*—Without proper shape ; *i. e.*, ugly.

., *Phantasms.*—Exaggerated fancies.

,, *Swell the tales*—Give interest to the stories.

,, *Sail.*—(Synecdoche.) Ship.

,, *This fragment of a world*—The ship with its population is likened to a broken piece of the world, because the people on board are separated from the rest of mankind.

,, *Hastening, &c.*—On its way to some country where the people of the ship will again hold intercourse with the mass of their fellowmen after having been cut off from them by the sea.

Page.

186. *Has brought, &c.*—Has established intercourse be-
tween peoples that were most far apart.

„ *Has established.*—Takes the produce and manufac-
tures of one country to another, and so distributes
good things among all nations.

„ *Has diffused, &c.*—Has brought educated and civil-
ized people in contact with those who were igno-
rant and rude.

„ *Charities.*—Kindnesses.

„ *Scattered portions.*—The various nations separated
from one another.

🐾„ *An insurmountable barrier.*—(A barrier that cannot
be surmounted or got over.) The sea.

„ *Drifting.*—Floating aimlessly.

„ *Monotony.*—(Gr. *monos* above, and *tonos* a tone.
Oneness of tone.) Sameness.

187. *Expanse.*—Open sea.

„ *Spar.*—A mast.

„ *The wreck.*—This spar; which, as a piece of the
wreck, is here called " the wreck."

„ *Flaunted.*—Beat about.

„ *Oblivion.*—Complete forgetfulness.

„ *Like the waves.*—(Simile.) Silence and oblivion are
represented as doing what the waves had done,
viz., covered them.

„ *Their end.*—How they died.

„ *What sighs, &c.*—How many people, who had friends
or relations on board, have been sighing and griev-
ing, because they could receive no tidings of the
ship.

„ *Offered up.*—Have been offered.

„ *The deserted fire-side.*—(Synecdoche.) The fire-side
in cold countries like England, where fires are kept
alight in the house and the whole family habitually
gather round the fire, stands for the home. " The

deserted fire-side " refers to the many families from which one or more members had gone on board their ship, and to which they would now never return.

187. *Pored over.*—Read anxiously and long.

  „ *Rover.*—(A thing that roves or wanders.) The ship.

  „ *Darkened* —(Intransitive verb)

  „ *How has expectation, &c* —(An example of the figure called climax.) The steps of the gradation are expectation, then anxiety, then dread, and finally despair.

  „ *Moments.*—Any little thing which belonged to any one of those who have perished, by which he might be remembered.

  „ *For love to cherish.*—For those who loved them to cherish.

  „ *And was never, &c.*—These words are placed within inverted commas, because they are the phrase by which it is common to speak of vessels that are believed to have been wrecked at sea.

  „ *Dismal.*—Having a gloomy or saddening effect.

  „ *Break in upon.*—Disturb.

  „ *Ghostly.*—(Like a ghost.) Hideous, frightful.

  „ *Every one had his tale.* —Every one had a story to tell.

  „ *Surges.*—Swellings of water, waves.

  „ *Deep called unto deep.*—This is a quotation from the Bible. See Psalm XLII ; verse 7. The phrase is here quoted to denote the tumultuous roaring of the sea, as if one sea was calling to another.

  „ *Rent.*—(Past of the verb "to rend.") Torn.

  „ *Succeeding darkness.*—The darkness that followed immediately after the lightning.

  „ *Caverns.*—The troughs between the huge waves.

  „ *Preserved her buoyancy.*—Continued to float.

Page.

187. **Yards.**—The cross-beams against a mast. (The dipping of the yards, which are placed transversely to the ship, would indicate that the vessel "rolled" fearfully from side to side. The "bows being buried in the waves" would indicate that the vessel "pitched" violently.)

,, *An impending surge.*—A huge wave, higher than the ship itself and threatening to fall upon it.

,, *Dexterous.*—Quick and clever.

,, *The awful scene, &c.*—I could hear all the sounds occasioned by the storm.

,, *The rigging.*—The ropes, &c , about the masts

188. *Funeral wailing.*—Lamentations over the dead.

,, *Staining.*—Violent efforts to get loose.

,, *Bulk-heads*—The partitions in a ship, made with boards.

,, *Laboured.*—Moved with difficulty.

,, *Weltering.*—Rolling.

,, *In my very ear.*—(Being in his cabin, there were only the planks, of which the ship's sides were made, between him and the sea.) Very close to me.

,, *Raging.*—Making an angry noise.

,, *This floating prison.*—The ship, so called because it was floating upon the water and there was no escape from it.

,, *Its prey.*—Those whom it wanted to destroy.

,, *Starting of a nail.*—The coming off of one of the nails that kept the boards of the ship together.

,, *The yawning of a seam.*—The opening of one of the joinings between the boards.

,, *Might give him* (Death personified) *entrance.*—By allowing the water to rush in, it might sink the ship and destroy the lives of all on board.

,, *These dismal reflections.*—The thoughts of death.

,, *Fair wind.*—Favorable wind.

Page.
188.   *Decked out.*—Dressed out.

"   *Canvas.*—Sails.

"   *Swelled*—(Being swelled) with the wind which would give the sails a swollen appearance.

"   *Careering.*—Moving rapidly.

"   *Curling.*—Description of the arched tops of the waves.

"   *Gallant.*—(Accent on the first syllable—*gallant.* A gal*lant* (accent on the second syllable) means a man who is full of polite attentions to ladies) Brave.

"   *To lord it over.*—To act the lord over ; to rule.

"   *It is time to get to shore.*—It is time I went on with my narrative, and brought it to a close by describing how I got back to shore

"   *Thrilling.*—(Cause a tingling along the nerves.)

"   " *Land* '—Elliptical for, " there is land in sight '

"   *Was given*—Was called out by a sailor who was at the top of the mast.

"   *Delicious.*—Very pleasant.

"   *Throng*—Crowd.

"   *Volume of associations.*—A great multitude of suggestive thoughts

"   *The land of promise*—This is a Bible phrase, applied to Palestine, which was the land which God promised to Abraham to give to his descendants, the Israelitish nation, and to which He at length conducted them, after delivering them from Egypt and taking them across the desert. As eagerly as the Israelitish people looked forward to Palestine, so eagerly. and, with a similar joy, does the American look forward to beholding Europe.

"   *Teeming.*—Abounding.

"   *Of which his childhood has heard.*—Which he heard of when he was a child.

Page.

188. *Or on which, &c.*—Or which he thought of later on, when, as a young man, he studied books for himself.

,,   *Pondered.*—Thought.

,,   *It was all.*—The only thing that everybody felt was feverish excitement. The word "feverish" is here used to signify, very intense, very eager.

,,   *Prowled.*—(Metaphor) Moved about like an animal in search of prey.

,,   *Guardian.* — (Parse as an adjective qualifying "giants.')

,,   *Headlands*—Points of land jutting out into the sea.

,,   *All were objects.*—(Parse "all" as in apposition to "ships of war," "headlands," and " Welsh mountains."

,,   *The Mersey.*—A river on the west of England, which falls into a large estuary at Liverpool.

,,   *Mouldering.*—Crumbling.

,,   *Taper.*—(Adjective.) Rising gradually to a point.

,,   *Some idle lookers on.*—Some being idle lookers on. (Parse lookers-on as one word.)

,,   *Consigned.*—Sent to.

,,   *Calculating brow.*—Forehead, which looked as if he was calculating what profit he would get from the cargo brought by the ship.

,,   *Air.*—Behaviour, manner.

,,   *In deference to.*—Out of respect for.

,,   *His temporary importance.*—His importance for the time being, he being the man most concerned in what the ship had brought.

189. *Between the shore and the ship.*—Between the people on the shore and those on the ship. (Metonymy.)

,,   *Her eye hurried over.*—She glanced rapidly over.
,,   *Neared.*—(From the verb "to near.") Came near.
,,   *Messmates.*—Those who had the same mess with himself, *i. e.*, his fellow-sailors.

Page.
189. *Had taken to.*—Had been obliged to go and to re-
   main in.

„   *Hammock.*—A hanging bed suspended by hooks, in
   which sailors usually sleep on board of ship.

„   *Breathed.*—Feebly expressed.

„   *Helped on deck.*—Helped on to the deck, *i.e.*, helped
   to come on deck.

„   *Shrouds.*—The large ropes reaching from the top of
   the mast to the side of the ship.

„   *The eye of affection.*—The person who loved him
   most. (Synecdoche.)

„   *Her eye, &c.*—Her eye suddenly turned to his face.

„   *A whole volume.*—A whole book ful.

„   *The meeting, &c.*—The subjects in this sentence
   have no verb supplied, because this would weaken
   the graphic effect of the description.

„   *Cheering.*—Welcome.

„   *The land of my forefathers.*—Irving was an Ameri-
   can, a descendant of those who had originally
   emigrated to America ; but he himself had never
   seen England before.

NAPIER.

Sir William Napier was born in the year 1795. He was present
at the siege of Copenhagen in 1807, and served in the subse-
quent campaigns in the Spanish Peninsula.
He afterwards became Lieutenant-Governor of Guernsey. He is
known as the author of the " History of the Peninsular War."
He died in 1860.

The Battle of Corunna and death of Sir John Moore.

„   *Sir John Moore.*—Born in 1761, died in 1809. A
   distinguished English general, who, in 1808, was
   sent with an English force to Portugal, with a
   view to co-operate with the Spanish troops
   against the French in the Peninsular War. Find-

ing that the Spanish troops had been routed, and, discovering that the French intended to surround him, he commenced a rapid march to Corunna. Here he met the enemy, and inflicted on them a decisive repulse ; but he gained this victory at the sacrifice of his own life.

189. *Countenance unchanged.*—(Case absolute.) His countenance being unchanged.

„ *Fixed.*—Being fixed.

„ *In his front.*—In front of him.

„ *No sigh betraying* —He giving forth not even a sigh, to show that he was suffering pain.

„ *Gaining ground.*—Advancing successfully.

„ *The rear.*—The back of the army.

„ *Was seen.*—Has for its subject " the dreadful nature of his hurt."

„ *Hurt.*—Wound.

„ *Bated of.*—Deprived of all flesh.

„ *Recoil.*—Bounding back, after being cut.

„ *The dragging of the shot.*—From the cannon shot drawing along with it what came in its way.

„ *I had rather it, &c.*—I prefer that the sword should, &c.

„ *The reserve.*—The force that had been kept in reserve.

„ *La Houssaye.*—A French commander.

„ *Dragoons.*—(The name originally given to knights who fought under the standard of a dragon. Dragoons are of French origin.) A class of soldiers who fight on horse-back or on foot as occasion may require.

„ *Dismounted.*—Come down from their horses.

„ *Turning.*—The English reserve turning the enemy. (the French).

Eminence.—Hill.

Page.
189. *Battery.*—Guns.

  ,, *Companies.*—A company is a division of a regiment, generally consisting of about a hundred men.

  ,, *The fourteenth* —The fourteenth regiment.

  ,, *Carried.*—Succeeded in taking.

  ,, *Dispute.*—Contest, fight.

  ,, *Their line.*—Their army.

  ,, *The original position of the morning* —The position which the English first occupied in the morning.

  ,, *Into action.*—Into the battle.

  ,, *Signal.*—Complete.

  ,, *Ammunition.*—Powder and shot.

  ,, *Soult* —Marshal Soult was born in 1765, and died in 1851. He was the greatest French commander, next to Napoleon, and distinguished himself in the Spanish campaign, where, however, he was no match for the Duke of Wellington.

  ,, *Was in full tide.*—Was flowing strongly.

  ,, *To tempt fortune.* (Fortune is represented as a goddess, who, if too many favors are asked of her, will bring disaster.) To presume too much on one's good fortune.

  ,, *Their ground.*—Their position.

  ,, *Embarking.*—Going on board of ship.

  ,, *Upon whom, &c.*—Sir John Hope was the next senior officer, and so took the command of the British force, when Sir John Moore was disabled.

  ,, *To ship* —(Verb.) To put on board of ship.

  ,, *The piquets.*—Guards placed in front of an army, to give notice of the enemy.

  ,, *To cover the retreat.*—To deceive the enemy, so as to prevent their knowing that the English force was retreating.

  ,, *Under the protection, &c.*—Hill's brigade kept the

Page.

191. *Grape.*—A cluster of small shots put into a canvas bag and fired off out of a gun.

,, *Malignity* —Malicious misrepresentation.

,, *Could offer to.*—Could offer as incense to ; could employ to please those political leaders or statesmen, who condemned the conduct of the Government in the Peninsular War, and, therefore, presented, in an unfavorable light, everything that took place in it, and among other events, this battle of Corunna.

,, *Faction.*—Political party.

,, *The general who had conducted it.*—Sir John Moore.

,, *Of his countenance.*—Expressed on his countenance.

,, *Discovered his satisfaction.*—Showed his pleasure.

,, *Staff*—Officers in personal attendance on the commander.

192. *Extinct.*—(From the verb " to extinguish.") Ceased.

,, *Posthumous calumniator.*—(L. *post* after and *humus* the ground) Men who would misrepresent his conduct after he had been put under ground, that is, after he was dead.

,, *Interred.*—(L. *in* into and *terra* the earth.) Put into the earth ; buried.

,, *Disinterested.*—Unselfish

,, *The primitive age.*—The first ages ; the early history of a nation, when the nation still has rude and unrefined habits.

,, *Searching.*—Keen.

,, *Lofty.*—Here opposed to everything mean.

,, *Habitual.*—(Adjective qualifying "lofty sentiments.")

,, *Subtle.*—Refined.

,, *Ascendancy.*—Superiority.

,, *Decisive.*—Having no signs of hesitation or uncertainty.

,, *The right.*—(Noun.) What he considered to be right.

Page.

192. *Bordering upon.*—That was almost.

,, *Talent* —Natural ability.

,, *And with characteristic propriety.*—And they acting as was to be expected from their character.

,, *Profession.*—The military profession.

,, *The fortune.*—The opportunity

,, *The stream of time.*— (Metaphor.)

,, *The inspiring hopes.*—The hopes which had animated him.

,, *Austerer.*—Sterner.

,, *Of suffering.*—Of having to bear suffering.

,, *That gift.*—The glory of suffering.

,, *Presumptuous ignorance.*—Ignorant men who presumed to sit in judgment on his character and conduct.

,, *Foolish projects, &c*—This has reference to the advice by which the English ambassador tried to control Sir John Moore in military matters, which he had no business to do.

,, *Fortitude* —Courage in bearing adverse influences.

,, *Fortune frowned, &c.*—Although circumstances went against him, he was not on that account moved from his purpose.

The mortal blow.—The fatal wound.

,, *Lingering hours.*— The hours are represented as lingering or moving slowly, because, to a person suffering acute pain, time seems to pass very slowly.

,, *Dissolution.*—Death.

,, *Gallant.*—(Accent on the first syllable.)   Brave.

,, *Dignity.*—Marked with dignity.

,, *Conscious.*—Adjective qualifying "he."

,, *Leveller.*—One who puts everybody on the same level. This death is said to be because it reduces king and peasant alike to the same abject condi-

Page.

‎· tion.   When the writer, however, says that, in the case of Sir John Moore, death was not a leveller, he means that in his case, death brought to him a glory which he had not had before, and so, instead of reducing him to the level of others, it raised him above others.

THE CLOSE OF THE BATTLE OF ALBUERA.

192   *Gallant line.*—Brave array of soldiers

,,   *Broken multitude* —The mass of soldiers whose order or formation had been broken.

,,   *Startled.*—Surprised and frightened.

,,   *As to.*—As if to.

,,   *An assured victory.*—A victory which they were sure of gaining.

,,   *Vomiting forth.*—Giving forth in large quantities.

,,   *A storm of fire.*—The firing was so tremendous, that it was like a storm, in which not rain, but fire was pouring down on all sides.

,,   *Enlarge, &c.—*Stretch out their front ranks.

,,   *Whistled.*—As each bag of grapeshot was discharged, the scattered shot made a whistling sound as they sped through the air.

,,   *The fusilier battalions.*—(A fusilier was originally a soldier armed with a fusil   Now, the only thing that distinguishes him from any other infantry soldier is the peculiarity of the cap he wears.)   A battalion (from the French *bataille* battle) is a body of infantry arrayed for battle.   It has come to be applied to a body of 500 men or so, forming a division of a regiment.)   The battalions composed of fusiliers,

The iron tempest —The storm of iron shot discharged from the guns,

Like sinking ships.—Simile.

Sternly,—Determinedly.

Page.
149. *Recovering* —Getting back into order and steadiness.

,, *Closed on.*—Came into close quarters or personal contest with.

,, *Was seen.*—The subject of the predicate " was seen" is the clause, " with what a strength," &c.

,, *Animate.*—Encourage.

,, *Veterans* —The old soldiers.

,, *Break, &c.*—These old soldiers, coming out from among the close ranks of their fellow soldiers, met the English troops and engaged them in fight, in the hope that their fellow soldiers behind would meanwhile have time to steady themselves and prepare for this close contest.

,, *Open out.*—Stand further apart, not so closely together. (They could not fight properly as long as they stood so closely together, and yet the British troops bore down upon them with such vehemence that they had not time to " open out." (Parse " open out" as an intransitive verb.)

,, *A fair field* —There was no unfair advantage that either party had.

,, *Bear up.*—Try and withstand the pressure of the English troops.

,, *Indiscriminately* —Without distinction.

,, *Hovering.*—Moving about.

,, *On the flank.*—On the side.

,, *To charge.*—To attack.

,, *That astonishing infantry.*—The British troops, whose courage astonished their enemies.

,, *Burst* —Display

,, *Undisciplined valour.*—Untrained courage.

,, *Enthusiasm.*—Momentary excitement under some strong feeling.

,, *Stability.*—Firmness.

,, *Order.*—The order in which they advanced.

193. *Flashing.*—Darting forth light. (A strong metaphor, expressive of passionate excitement.)

,, *The dark columns.*—The French columns appeared dark, because they were so closely massed together.

,, *Their measured tread.*—The uniform step with which the British soldier moved forwards.

,, *Swept away the head of every formation.*—When ever the French troops made any attempt (beginning "head") to form themselves into proper order to receive the enemy, they were shot down.

,, *Dissonant.*—Harsh.

,, *Broke from.*—Escaped from, were given utterance to by the French troops.

,, *Tumultuous crowd.*—The French troops were a confused crowd of men. there was no order among them

,, *As slowly, &c.*—(" As " does not qualify "slowly," but "was pushed." "As" means "in proportion as ") The crowd of French troops began to give forth wild despairing cries as " it " (the crowd) was being pushed further and further back by the advancing British.

,, *Carnage*—(L. *caro-carnis,* flesh) Slaughter.

,, *The attack.*—Made by the British.

,, *Reserve.*—The troops held in reserve, and which usually remained in the rear.

,, *Irremediable.*—That which cannot be remedied.

,, *The mighty man*—The great crowd of troops.

,, *Like a loosened cliff*—(Simile.) Like a mass of rock loosened from the hill-side and ready to fall.

, *The steep.*—(Noun.) The steep or perpendicular side of the hill.

,; *Flowed after.*—Followed the men by itself also falling down the steep.

,, *Streams.*—(Case absolute)

Page,
194. *The remnant.*—(In apposition to " eighteen hundred unwounded men.") What was left.

,, *Unconquerable.*—Many British soldiers had died in battle, but they had not been conquered.

,, *The fatal hill.*—The hill which had been the death place of so many.

THE BRITISH INFANTRY.

,, *Robust.*—Strong and healthy.

,, *Can be doubted*—Has for its subject the noun-sentence " that the British infantry soldier," &c

,, *In 1815.*—This was the year of the battle of Waterloo. The reference, however, is to the Peninsular War, in which the British was only one of several armies in the field.

,, *'Frame.*—Body.

,, *The united armies of Europe.*—The armies of Great Britain, Prussia, Russia and Austria.

,, *Wet.*—Exposure to wet.

, *His port.*—The way he carries himself. (τ *porto* to carry.)

,, *Bearing.*—Carriage.

,, *Vivacity.*—Liveliness.

,, *Censure.*—Blame.

,, *Full of resources.*—Always having some means of meeting difficulties

,, *Careful of his officers.*—Quick to defend his officers.

,, *Imminent.*—Threatening.

,, *Phlegmatic.*—Dull, sluggish.

,, *Uninspired by moral feeling.*—Not influenced by any feeling of enthusiasm, or ambition, or honor, &c.

,, *Bright fields.*—Victorious battles.

,, *Every helmet.*—(Synecdoche.) Every soldier.

Page.

191. *Caught some beams of glory.*—Had his share of glory
given him. (" Bright fields where, &c.," is a meta-
phor. Glory is likened to the sun shining on the
battle field, and, consequently, flashing light on
every steel helmet in the field, that is, every
soldier)

,, *Conquered.*—(Parse as a verb in the past tense,
having for its subject " British soldier.")

,, *Cold shade.*—Indifferent treatment; unconcern or
want of interest in the common soldiers shown by
the aristocracy.

,, *Aristocracy* —(Gr. *aristos* best, and *krateo* to
govern. The word was originally applied to the
form of government in which the best men in a
State, that is to say, the principal men, were
vested with the supreme power. It has since come
to be applied to the nobility in a country.) The
officers under whom the British soldiers fought,
were men belonging to the English nobility, who
had no sympathy with the common classes of the
people to whom the British soldiers belonged ; and
they, therefore, saw their courage and endurance
without feeling any lively sympathy for them.

,, *No honors.*—The rewards were given to the officers,
not to the common soldiers. This was unlike the
French army, where every private soldier has a
chance of rising to any height in his profession,
if he shows himself worthy.

,, *Did his heart sink.*—Did he lose courage ?

,, *Fortitude* —Bravery of endurance.

,, *Unmoved.*—Participial adjective qualifying " he."

,, *Prove.*—Did he not prove.

,, *Physical.*—Bodily qualification necessary for a sol-
dier.

,, *The fount of honor.*—The feeling that honor was to be
maintained at all hazards.

,, *A hundred battles.*—Synecdoche. A definite for an
indefinite number.

DICKENS.

CHARLES DICKENS, one of the most successful of modern novelists, was born at Landport, Portsmouth, in 1812. He was intended at first for the Law, but became a Newspaper Reporter. He wrote "Sketches by Boz," "Pickwick Papers," "Nicholas Nickleby," "Oliver Twist," "The Old Curiosity Shop," and "Barnaby Rudge."

In 1841 he paid a visit to America, and in 1845 was appointed Editor of the "Daily News," in which appeared his "Pictures of Italy." Soon after, he gave up the papers, and returned to the writing of fiction. He wrote "Dombey and Son," "David Copperfield," "Bleak House," several "Christmas Tales," the "Child's History of England," "Little Dorrit," and edited the "Memoirs of Grimaldi." Till 1859, he edited the magazine entitled "Household Works," but gave it up then, to establish another, called "All the Year Round." He died suddenly on the 9th June 1870.

214. *Joan of Arc*—Was born at Domremy in Lorraine, France, in 1410. She is commonly known as the Maid of Orleans. She declared that St. Michael, the tutelary angel of France, had appeared to her and commanded her to raise the siege of Orleans then closely pressed by the English. This she succeeded in doing at the head of a relieving force. She was afterwards taken prisoner at Compieigne by the English, who condemned her as a sorceress. She was burnt at Rouen in 1431.

,,　*Lorraine.*—A province in France.

,,　*A countryman.*—A peasant.

,,　*Jacques D'Arc.*—Pronounce *Zhak Dark.*

,,　*A solitary girl.*—Without children, or companions.

,,　*Before it.*—In front of it.

,,　*Shadowy figures.*—The figures of human beings, but not substantial.

,,'　*Ghostly.*—Weird ; superstitious.

,,　*Angels.*—(Gr. *angelos* a messenger.) Spiritual intel-

less, who formed a secret treaty with Henry V of England. He was assassinated by the Orleanists.

215. *Marauders.*—Parties of soldiers who went about in search of plunder.

,, *A-laughing.*—The prefix "a" is probably a contraction of "on."

,, *Well sprinkled with holy water.*—In allusion to the belief among Roman Catholics, that the sprinkling of a person with holy wate. has the effect of driving the devil from him.

,, *Squires.*—Gentlemen attendants.

216. *As well he might.*—Stare.

,, *The best place, 'too* --This was also the best place he could go to.

,, *On and on.*—Adverbial phrase expressive of sustained action.

,, *His court.*—The people by whom he was attended.

,, *He pretended so.*—He pretended that she had told him.

,, *Cathedral of St. Catherine.*—The name of the Cathedral.

,, *Fierbois.*—A town in France.

,, *Old crosses.*—Marks of a cross.

,, *Old, old.*—(The repetition of the adjective makes the meaning intensive.) Very old

,, *Sure enough.*—An interjectional phrase.

,, *Which they held* —"Which" has for its antecedent the question "whether," &c.

,, *Prodigiously.*—Excessively.

,, *Gruff.*—Having a harsh voice.

,, *Put new heart.*—Put fresh courage.

,, *Dispirited.*—Disheartened.

, *Maria.*—The Latin form of "Mary," the mother of Christ.

Page.
216. *State.*—Grand appearance.

,, *Escorting.*—Accompanying.

,, *Provisions.*—Food.

,, *Beleaguered.*—Besieged.

,, *The maid of the prophecy.*—The maid spoken of in the old prophecy.

,, *Within the walls*—Of the town.

,, *Thrown over.*—Thrown over the walls.

,, *Lord Suffolk.*—The commander-in-chief of the English army before Orleans.

,, *Which did not mend the matter, &c.*—(The antecedent of the relative " which " is the circumstance that " the English general very positively declined," &c.) The fact, that the English general did not believe in Joan of Arc's having received any heavenly communications, did not quiet down the minds of the soldiers.

,, *Towers.*—These were built for the defence of the bridge.

,, *A scaling ladder.*—A ladder used for mounting the wall of a fortified place.

,, *Chain of forts.*—Line or series of forts.

,, *The first part of her mission.*—The relief of Orleans. The second part was the assisting at the coronation of Charles at Rheims.

218. *Believed in her.*—Believed that she was inspired.

,, *Gave them any trouble.*—Offered them any resistance.

,, *Imposter.*—Deceiver.

,, *Friar.*—A religious order in the Roman Catholic Church.

,, *The old doubt*—The doubt that people used at first to have, as to whether she was inspired or was a witch.

,, *Ally.*—Helper.

Page.
218. *Ten thousand sometimes believing, sometimes unbe-*
lieving,   men.—Ten thousand qualifies " men."
" Sometimes " is an adverb of time qualifying
" believing," and the two words might have been
written with a hyphen between, thus " sometimes-
believing," and parsed as one word, that is to say,
as a participial adjective qualifying " men." The
same remark applies to " sometimes unbelieving.")
" Ten thousand, sometimes-believing, sometimes-
unbelieving, men."

,,   *Sturdily.*—Obstinately.

,,   *Incredulous.*—Unbelieving.

,,   *Escort.*—The person who had accompanied her at
first to Baudricourt. (This word is here used
as a noun. It is also used as a verb. When it is a
noun, the word is pronounced *escort ;* when a verb,
it is pronouced *escort.*

,,   *Village.*—Parse as an adjective qualifying " wheel-
wright."

.,   *Wheel-wright and cart-maker.*—Nouns in apposition
to escort.

,,   *Settled upon her* —Arranged that she should receive.

,,   *The income of a Count.*—Such an income as would be
given to a Count.

,,   *Count.*—A title of foreign nobility, equivalent to an
earl in England.

,,   *Happy had it been.*—It would have been happy.

,,   *Resumed.*—Again put on.

,,   *Rustic.*—Belonging to the country. The ordinary
dress of a peasant.

,,   *It was not to be.*—This was not to happen

,,   *A world.*—A great deal.

219. *The Duke of Bedford.*—To this man Henry V of
England had committed the conduct of the war
in France.

219. *Holding the Duke of Burgundy to his faith.*—Making the Duke of Burgundy keep his promise. (The treaty the Duke had made with England, compelled him to help England in this war with France.)

,, *Very like, &c.*—Just like the opinions of ordinary men in times of difficulty.

,, *Lost credit*—She began to be less and less believed in.

., *An opposition maid*—(Parse "opposition" as an adjective.) A maid who had set herself up in opposition to Joan of Arc.

,, *In a retreat.*—When the French were retreating before the enemy, they went off and left her behind.

,, *An archer.*—A soldier who used a bow and arrows.

., *O the uproar, &c.*—Oh, what an uproar was made.

,, *She was demanded to be tried*—The people demanded that she should be tried.

,, *Sorcery.*—Witchcraft.

,, *Heresy*—Holding religious opinions different from those taught by the Church.

,, *Any thing else you like.*—Whatever else might be suggested.

,, *Inquisitor-General.*—An Inquisitor is a person who presides at a Court to be found in some Roman Catholic countries, called an Inquisition, held for the trial and punishment of people charged with heresy.

,, *Plain Joan of Arc.*—Being plain Joan of Arc.

,, *Never have done.*—Never get done.

,, *Out.*—Adverb qualifying " had."

,, *Doctors.*—Learned men.

., *Bestowed their utmost tediousness on her.*—Wearied her out with their slowness.

., *Entrapped.*—(Caught, as in a trap.) Made to contradict herself.

Page.
219.   *Rouen.*—A town in the north of France.

 ,,   *Scaffold.*—A platform fo · the execution of a crimina'.

 .,   *Stake* —A piece of timber fastened in the ground to
         which a person condemned to be burnt was se
         cured.

 .,   *Fagots.*—Pieces of wood to be used as fuel.

 ,,   *At that pass.*—When matters had come to this ex-
         tremity.

 ,,   *Vermin.*—A phrase used to express utter contempt.

220.   *To hold to life.*—To cling to life : to want to live.

 ..   *With a cross.*—With a cross mark.

 ,,   *Recanting the past* —Denying the truth of the state-
         ments she had formerly made.

 .,   *Protesting.*—Earnestly asserting.

 ,,   *The bread of sorrow and the water of affliction.*—
         (This is a quotation from the Bible. See Isaiah
         XXX ; verse 20.)   The poorest prison-diet.

 .,   *But on the bread, &c.*—But in consequence of the
         bread, &c.   (The idea is, that owing to the body be-
         ing under-fed, the girl's mind became disordered,
         and she again began to fancy that she heard super-
         natural voices and saw visions ; the imagination
         having again become diseased.)

 .,   *Aggravated.*—Increased.

 .,   *Relapse.*—Falling back.

 ,,   *For such spectacles*—To be worn by people con-
         demned to be burnt.

 ,,   *Looking on* —Participle qualifying "priests and
         bishops."

 ,,   *Grace* —Good feeling.

 ,.   *Infamous.*—Disgraceful.

 ., ,   *They will rise, &c.*—The allusion is to the Christian
         belief, that there will a resurrection of the dead on
         the last day of the world's history.

SMILES

SAMUEL SMILES, a writer of the present day, was born in Scotland, in the year 1816, and began life as a Surgeon in the great manufacturing town of Leeds, in Yorkshire. In 1852, he was appointed Secretary to the South Eastern Railway. He is well and deservedly known to the English public as the author of t e "Life of George Stephenson," "Self Culture," "Self Help," "Character," and "Thrift."

221. *Individual.*—Parse as an adjective qualifying " self-help."

,, *Well-tried.*—Proved to be true by long experience.

,, *A small compass.*—A few words.

,, *In the individual.*—In individuals.

,, *Exhibited.*—Being exhibited.

,, *From without*—From outside one's self, *i. e.*, from other people.

,, *From within.*—From one's own self.

,, *Invigorates.*—Strengthens.

,, *Classes.*—Bodies of men.

,, *Over-guidance and over-government*—Too much guidance and too much government from others.

,, *The best institutions.*—The reference is to laws which nations have framed for themselves, and which have been intended to secure the improvement and the well-being of the people.

,, *An agent in.*—One of the means of promoting.

,, *To constitute.*—To form ; to be.

,, *The millionth part of a Legislature.*—Among the English, the people as a whole form the legislative body. It is the people who, through their representatives in Parliament, make the laws for the country. Every individual, therefore, is a member of the legislature, and, considering the large population of each country or borough sending a representative to Parliament, he may be regarded as " the millionth part of the Legislature."

,, *By voting, &c.*—An individual in England becomes a part of the Legislature in this way, that he votes for the man or men appointed to represent him in the Parliament that makes the laws.

,, *In three or five years.*—The interval after which our Parliament is dissolved and a new one is assembled.

Page.
221. *This duty.*—Voting.

„ *Negative.*—That is to say, Government does not *give* rights to the people. It sees that people are not deprived of their rights. It does not force people to do what will be to their advantage. But it restrains them from doing wrong. It does not say, "Thou shalt!" but it says, "Thou shalt not!"

„ *Restrictive.*—Imposing restraints, which is also a negative quality.

„ *Provident.*—(L. *pro* before and *video* to see) Foreseeing; careful for the future.

„ *Such reforms.*—From idleness to industry, &c.

222. *By means of individual action.*—By each person helping himself.

„ *The reflex.*—(L. *re* back and *flecto* to bend.) The reflection; the representation; the expression.

„ *Ahead of the people.*—In advance of the ideas of the people.

„ *Ignobly.*—Adverb qualifying "will be ruled."

„ *The nation.*—The condition of the nation.

„ *Civilization, &c.*—The civilization of a nation as a whole depends upon the improvement of each person forming the nation.

„ *The sum.*—The aggregate.

„ *As natural decay.*—In the same way as national decay.

„ *Decry.*—Condemn.

„ *Social evils.*—Evils that prevail in society.

„ *Perverted life.*—Life turned away from the right.

„ *Cut them down.*—Metaphor, taken from the cutting down of an overgrown tree.

„ *Extirpate.*—(L. *ex* out of and *strips* a root.) Root out.

„ *Luxuriance.*—Abundant growth.

Page.

222. *Which is also.*—"Which" refers to "individual character."

223. *John Stuart Mill.*—An eminent writer on political economy, and well known as the author of "System of Logic." His latest book is entitled "Liberty."

,, *Does not produce its worst effects.*—Is kept under check.

., *Individuality.*—Individual character, that is, the characters of the individuals that make up the nation.

,, *Crushes individuality.*—Prevents the individual character of a man from showing itself.

,, *Turning up.*—Appearing before us.

,, *Cæsars.*—"Cæsar" was the family name of the distinguished Roman house of Julian. From the first of the Roman Emperors, Caius Julius Cæsar, all the emperors who succeeded took the title of Cæsar. The modern Russian title of Czar is only a form of "Cæsar." The phrase has come to be employed, as in the text, to denote imperial despotic rule.

,, *Nationalities.*—Governments by the nation, that is, republics.

., *Acts of Parliament.*—Constitutional or limited monarchies, as in England, where the legislative power vests in Parliament.

., *Every thing for the people.*—Every thing is to be done for the people.

., *Cæsarism.*—Imperialism.

,, *Antagonistic.*—Opposed to one another.

,, *Victor Hugo.*—A celebrated French political writer. He was expelled from France by Napoleon III.

,, *The pen and the sword.*—Writing, so as to persuade people; or physical force, so as to compel them.

,, *The Dublin Industrial Exhibition.*—The following is the history of this Exhibition.—At a meeting of

Page.

the Royal Dublin Society held June 24th, 1852, Mr. William Dargan' offered to place the sum of £200,000 in the hands of a committee of 25 gentlemen for the construction of a building in which an Irish Industrial Exhibition might be held. The offer was accepted; but, by the time the building was sufficiently advanced to receive the articles intended for exhibition, Mr. Dargan had advanced £80,000. The exhibition was visited by the Queen and Prince Albert, and, after a most successful season, was closed on November 1st, 1853.

223. *That my own.*—But my own.

" *That intercourse.*—Intercourse with other countries.

" *Industrial independence, &c.*—If we want to be independent of other countries in the arts of industry, we must rely upon ourselves.

" *Utilization.*—(L. *utilis* useful.) The making use of.

" *Made a step.*—Made an advance forward.

" *I believe in my conscience*—I conscientiously believe; that is, I most truly believe.

224. *The grand result.*—The character of a nation

" *Building upon another's labours.*—Carrying on the work from where others have left off.

" *The artisans of civilisation.*—What builders and mechanics are in building a material edifice, that poets, philosophers, inventors, &c., are in the building up of the civilisation of a nation.

" *Which is placed.*—"Which" has for its antecedent, "rich estate."

" *Unimpaired.*—Uninjured.

" *The true measure, &c.*—The meaning is, that the power of the English nation arises from, and is always in proportion to, the self help of the individuals who make up the nation.

" *Privates.*—Private soldiers.

" *A soldier's battle.*—This is the designation given to a battle marked entirely by the sheer courage and

fighting force of the common soldiers, and not by any skill in generalship.

221 *Men in the rank.*—Men who have no position of command.

,, *Unwritten.*—Qualifies "lives."

,, *Pass unconsciously into*—Unconsciously influence.

,, *Individualism.*—Individual force of character.

,, *With it.*—With individualism.

,, *Behind counters.*—(A counter was originally a table in a shop, on which money was counted out. It has since come to mean the table or board on which goods are laid out for the inspection of customers. The seller stands behind the counter and shows his goods. Hence " behind counters " means) In shops.

,, *At the loom.*—Cloth-manufactories.

, *The busy haunts of men*—Places crowded by men engaged in business.

, *Schiller.*—A celebrated German poet and dramatist. Born 1759, died 1805.

225. *Literary training*—Critical acquaintance with literature.

,, *With his usual weight of words.*—With the usual importance that belongs to what he says.

,, *Bacon.*—An illustrious philosopher and statesman, known as the author of " The Advancement and Proficiency of Learning," and the " Novum Organum," as well as of several essays. He is known as the father of experimental philosophy. Born in 1561 ; died 1626.

,, *Studies teach, &c.*—The main benefit that a man gets from the subjects he studies, is not the knowledge acquired of the subjects themselves, but the wisdom he gains by being able to apply the knowledge to things outside and beyond the particular range of those studies.

225. *But that is a wisdom, &c.*—The antecedent of "that" is the fact that "studies teach not their own use." To know that studies do not teach their own use, is a wisdom which is to be found outside the studies themselves, in the world of life and action, and it is a wisdom which can be gained only by observation.

,, *Incentives.*—Inducements.

,, *Almost equivalent to Gospel.*—Almost equal in value to Gospel. (The Gospels are the first four books of the New Testament which give a sketch of Jesus Christ's life with his great sayings and doings, and furnish the noblest thoughts and the highest moral and spiritual teaching that the world has.

,, *High living.*—Living for high and noble purposes.

,, *Issuing.*—Resulting.

,, *What it is, &c.*—How much really a man can do for himself.

,, *Efficacy.*—Power.

,, *An honorable competency.*—A competency, or sufficiency of means of support, acquired by honourable labour.

,, *Apostles, &c*—(Gr. *apostolos,* one who is sent.) (The name of apostles was distinctively given to the twelve men whom Jesus Christ chose and sent out to preach the Gospel to the world. They were the apostles of the Gospel or the glad tidings of salvation through Christ. From that circumstance the term has come to be applied to men who seem to have a special commission for any work accompanied by special gifts for the accomplishment of it.) Men who have a special commission to give great thoughts to the world.

,, *Lords of the great hearts.*—Men who have had the power to move and influence the hearts and feelings of their fellow-men.

,, *The ranks.*—(This term is applied to common soldiers.) Common men ; men of the lower orders.

Page.
225 *Insuperable.*—That which cannot be overcome.

„   *Evoking.*—Calling forth.

„   *Stimulating into life.*—Making active.

„   *Dormant.*—Asleep; inactive.

226. *From the barber's shop*—Jeremy Taylor, Arkwright,
Lord Tenterden and Turner were all the sons of
barbers.

„   *Jeremy Taylor.*—Born in 1613; died in 1667. A
learnèd English prelate. He was chaplain to
Charles I, and espoused the Royalist cause The
book by which he is best known is his "Holy
Living and Dying."

„   *Arkwright.*—A well-known manufacturer, who was
the first to project a machine for spinning cotton,
and to whom England is indebted for new cotton
mills. Died in 1792.

„   *Spinning-jenny*—A machine for spinning wool or
cotton.

„   *Lord Tenterden.*—Born in 1762; died in 1832. An
eminent English Judge, and the author of a treatise
upon the law relating to "Merchant Ships and
Seamen."

„   *Turner.*—Born 1775: died 1851. A celebrated land-
scape painter. He, by his will, bequeathed the
finest of his pictures to the nation.

„   *Grazier.*—One who pastures cattle and rears them for
market.

„   *Wool-comber.*—One who combs or cleans wool.

„   *Scrivener.*—(L. *scribo* to write.) A writer; one whose
occupation it is to draw contracts or other writings.

„   *Epitome.*—(Gr. *epi* and *temno* to cut.) A brief
summary.

„   *Sea-phrases.*—Phrases relating to the sea and to ship-
life.

„   *Horse-flesh.*—Horses..

Page.

SIR CHARLES NAPIER.

226. *Sir Charles Napier.*—Born in 1782 ; died in 1853. A distinguished General. He accompanied the British army to Paris. After the battle of Waterloo, was made Governor of Cephalonia. Distinguished himself in India, during the time Lord Ellenborough was Governor-General, by his conquest of Scinde, and held the appointment of Commander-in-Chief of the Bengal army.

„ *They only make my feet, &c.*—They only make me more determined to carry out my purpose.

„ *Meeanee.*—A village in Scinde, six miles from Hyderabad. The battle took place in the year 1843.

„ *Beloochees.*—The people of Beloochistan.

„ *Temerity.*—Rashness.

„ *The Belooch centre.*—The centre of the Beloochee force.

„ *Up a high bank.*—To attack the centre of the Beloochee force it was necessary for Sir Charles with his men to ascend up a high bank.

„ *Mortal.*—Anxious.

„ *With their faces to the foe.*—This means, that, although they were driven back, they did not run away. They would have had to turn their backs to run away : this they did not do.

„ *Pluck.*—Courage.

„ *Tenacity.*—Holding on to one's purpose. (L. *teneo* to hold)

„ *The one neck nearer, &c.*—The allusion is to horse-racing. Where a race between two horses is close and severe, the horse that wins may win just because it reached the winning-post by the length of its neck before the other.

„ *Shows the blood.*—Shows that it has good blood.

„ *The one march more.*—The army that having marched almost to the verge of exhaustion, have determination enough to make yet another march.

Page
227. *Concentrate it.*—Bring the whole of it to bear on a given point instead of distributing it so as to be able to attack several points at once.

,, *Spartan.*—Sparta was a State of Greece celebrated for the hardy character of its people.

,, *"Add a step to it "*—If the sword is too short to reach your enemy with, take one step closer to your enemy.

,, *The more trouble.*—Elliptical for "the more trouble there is."

,, *The more danger.*—Elliptical for "the more danger there is."

,, *Cutchee Hills.*—The hills of Cutch in the west of India.

,, *Retainer.*—The person whom the juggler had to assist him.

,, *The "Talisman."*—This is one of the Waverly Novels. The incident referred to, is the story in the 27th chapter, of how Saladin with his keen scimitar at one blow cut in two a cushion of silk, which had been placed upright for the purpose.

,, *Retired from the encounter.*—Withdrawn from the challenge.

,, *Our fine fellows.*—Our soldiers.

NEWMAN.

oun HENRY NEWMAN, a modern English divine, was born in London, 1801, and educated at Oxford, where, in 1822, he was elected fellow of Oriel College, and afterwards became Vice-Principal of Alban Hall.
In 1833, he took a prominent part in "the Oxford movement," and published the "Oxford Tracts," in union with Messrs Pusey, Keble and others. In 1845, he joined the Church of Rome, and became rector of the New University established by the Roman Catholics in Dublin. He afterwards resigned that office. He has since been made a Cardinal of the Roman Catholic Church.

228. *Athenians.*—The people of Athens, the capital of Greece.

,, *Off.*—From.

Page.

229. *Democracy.*—(Gr. *demos* the people, and *krateo* to govern.) Government by the people. That form of Government in which the supreme power is lodged in the people collectively. Such was the Government of Athens.

„ *Offence of greatness.*—Crime of being great.

„ *Any foe.*—Any enemy outside.

„ *Sea board.*—Sea coast.

„ *Cupidity.*—Greed.

„ *Successful enterprise of invaders.*—Success on the part of other nations attempting to invade the country.

„ *Internal order.*—Order in the State itself, and among the people.

„ *A body politic*—(Parse "politic" as an adjective qualifying "body") A state.

„ *Innate.*—Born in one; natural.

„ *The beautiful and true.*—(Parse "beautiful" and "true" as nouns.) The things that are beautiful and true.

„ *Served them better for the observance.*—Helped them to observe.

„ *The extreme of, &c*—Self-government carried out to its extreme result.

„ *In its external relations.*—In its relations to other nations.

230. *Philip*—Was king of Macedon, one of the countries of Greece, and the father of Alexander the Great. He threatened an invasion of the State of Athens, and it needed all the eloquence of Demosthenes to arouse the Athenians to self-defence.

Demosthenes—Was the greatest of Grecian orators. It was after many years of persistent self-train-ing, in course of which he had many defects to overcome, that he appeared in public life. He attained great fame by the orations called Philip-

pics, by means of which he aroused the Athenians
to a sense of their danger, when Attica was threat-
ened by Philip of Macedon.   After serving Athens
in many ways, both as an orator and a statesman,
he died by poison in the year 322 B. C., being
afraid of falling into the hands of Antipater.

230. *Could oppose*, &c.— Could organize a military force
that would be a match for the Macedonian army.

„ *Anterior.*—Former.

,, *Political force.*—Force as a State or political power.

,, *Barbaric monarchy.*—The Goths under Alaric.

,, *Inordinately.*—Excessively.

., *Country.*—Elliptical for any country.

,, *That similarly small strip*, &c.—Palestine;' which is
identified with the history of the Hebrew or Jewish
nation.

,, *Regime.*—(Pronounce *re-zheem.*)   Government.

,, *Superlatively.*—In the highest degree.

,, *Insisted on.*—Parse " on " as an adverb qualifying
" insisted."

,, *Her great historian.*—Thucydides, who wrote the
history of the Peloponnesian war.

,, *Pericles.*—A celebrated Athenian general, statesman,
and orator.   He commanded the army in the
Peloponnesus, and took Byzantium and Samos.
He was the great patron of arts, letters, and
luxury.   Died in 429 B. C.

,, *Private, not public achievements.*—Things accom-
plished by the *people*, not by the *State.*

,, *Rome.*—The Roman State.

,, *With political foresight.*—With a view to future
political results.

,, *Royal Academies.*—(The academy was originally the
the garden or grove near Athens where Plato and
his followers held philosophical conferences)   In-
stitutions for the cultivation of the fine arts.

Page.

230. *Was done.*—Misprint for, "were done."

„ *Socrates.*—A celebrated philosopher of Athens, born 468 B. C. He began life as a sculptor, and took to the study of philosophy at the instigation of Crito. He was a man of plain manners and frugal habits. In his teaching he principally aimed at recommending virtue. He was accused before the Athenian Council of corrupting the Athenian youth, and ridiculing the gods, and on these charges was condemned to death. He died 399 B. C.

231. *Xenophon.*—An Athenian general, who, in 401 B. C., joined the Greeks in the fray of Cyrus, and accompanied him against his brother Artaxerxes, king of Persia. After the battle of Cunaxa, in which Cyrus was slain, he conducted the ten thousand Greeks back to the Chrysopolis. He wrote the "Cyropædia" or "Life of Cyrus the Great," "The "Anabasis," or "Retreat of the Ten Thousand," "The Memorabilia of Socrates," and other works. He died about 359 B. C.

„ *Mercenary.*—A soldier in the pay of a foreign country.

„ *Miltiades.*—An Athenian general and governor of the Athenian colony in the Chersonese in B. C. 513. He defeated the Persians at the battle of Marathon in 490 B. C. Died in 489 B. C.

„ *Chersonese.*—(*Chersonesus* is a Greek word equivalent to the Latin peninsula.) The Chersonese here referred to, was the Thracian Chersonese, at the south of Thrace and west of the Hellespont. It was to this place that Miltiades led a colony of the Athenians.

„ *He met his death, &c.*—Miltiades, who, after Marathon, had command of a naval squadron, was dangerously wounded at Paros, and being accused of holding intelligence with the Persians, was condemned to death, the sentence being afterwards

altered to imprisonment; but he died very soon
after of his wounds.

231. *Prosecuting his private interests.*- -Seeking persona
advantage.

Themistocles.—Born about 514 B. C., died 449 B. C.
A celebrated Athenian commander. He was ap-
pointed to command the Athenian fleet when
Xerxes invaded Greece. He wanted to induce the
Greeks to met the Persians at Salamis; but as
soon as Xerxes' fleet made its appearance, the
Peloponnesians prepared to sail away. To prevent
their going away, he sent a messenger to Xerxes,
to tell him that now was his opportunity, if he
could only cut off the retreat of the Greeks.
This conduct on the part of Themistocles is the
"double drift" or intention referred to in the text.
It may be that he merely intended to force the
Greeks into a fight, knowing that this was all
that was necessary to secure a glorious victory;
or it may be that he was acting treacherously
towards his own country by pointing out to the
Persians their favourable opportunity ; or it may
be that he intended to secure the double purpose
of seeming faithful to his own country in the very
act in which he seemed to recommend himself
to the favor of the Persian monarch. Being accus-
ed of being an accomplice in the treasonable
designs of Pausanias, Themistocles escaped to
Persia, where he gained great influence over the
king. He died at the age of 65.

Salaries.—An island off the west coast of Attica.
It was here that the fleet of Xerxes was defeated.

At home.—In Greece.

Hannibal.—A celebrated Carthaginian general, who
established the Carthaginian power in Spain, and
then advanced into Italy, with a view to overthrow
the Roman power. He died about the year 183
B, C.

PARALLEL CHARACTERISTICS OF ENGLISHMEN.

Page.
233. *It cannot manage.*—A nation as such cannot manage.

,, *Disparagement.*—Diminution of value.

,, *Constitutional State* —The term "constitution" is
generally used with reference to a government in
which the power of the sovereign is limited by
law or usage. A constitutional state is a state
having such a constitution or form of govern-
ment.

,, *Deference.*—Respect.

,. *Weapons, &c.*—Means, which are destroyed in time of
war.

,, *Cut their coat, &c.*—(Cut out the coat according to
the quantity of cloth they have for making it.)
Undertake only what they have the means of
carrying out.

.. *John Bull.*— A phrase designating Englishmen gener-
ally.

', *Forte* —Strong point. (Parse as a noun.)

, *As great lawyers* —In the same way as some great
lawyers.

.. *Literary men.*—Men given to the cultivation of liter-
ature.

,, *Complex.*—Intricate ; not simple.

,, *Coat of-arms.*—That on which ensigns armorial are
represented. (Ancient knights used to wear a
habit over their arms in which their armories were
embroidered in gold and silver.

The idea of the passage beginning "John Bull," &c.,
is this : Just as lawyers, who are students, are some-
times ambitious to be known as good dancers,
dancing being an art entirely out of their line ;
as literary men like sometimes to show off a coat-
of-arms whereas fighting is entirely out of their
line ; so the English nation likes to believe that
it can manage a war, whereas as a nation it is
designed for the arts of peace and not of war.

(169)

Page.
233. *Herald's College.*—A college established in the time of Richard III, in which pedigrees are preserved and grants of arms are made and registered.

,, *Why not content.*—Why will we not be content.

,, *Think twice.*—Consider the matter carefully.

,, *Attica.*—This state of Greece of which Athens was the capital.

,, *Remove from the highway of the world.*—Out of the way by which the other nations of the world come and go.

,, *Flood.*—(Metaphor.) Desolating influence; conquest by.

,, *Eastern and northern barbarism.*—Athens suffered from both: from an invasion of the Goths from the north, and from the Mahomedan power from the east.

., *A cheap defence.*—A means of defence which it has not cost them anything to keep up.

., *Weathering it.*—Navigating it in all weathers.

,, *Their wooden walls.*—Their ships.

,, *A second rampart.*—The sea itself being the first.

234. *Defences.*—Means of defence; that is, the sea and their ships.

,, *Dane.*—King Sweyn, who invaded England in 1003

., *Norman.*—William the Conqueror, who invaded England in 1066.

,, *Dutch.*—William III, who invaded England in 1689

,, *Organised resistance.*—Resistance properly arranged for.

,, *Like military.*—Like a military force which a conqueror might use against the people themselves. A military force may be used to keep down a conquered people or protect a conqueror; but a naval force (ships) is of no use for either purpose

,, *Determining the direction, &c.*—The insular situa-

15

234   *In strong relief.*—(Relief in painting or drawing is the appearance of projection given to the features of a picture, giving them a bold and distinct appearance.) Very distinctly portrayed.

,,   *He is indeed.*—" He" has for its correlative " Englishman."

.,   *A bully.*—One who takes advantage of his own superiority to domineer over the weak.

,,   *Bigot.*—One who is unreasonably attached to his own particular creed or religious practice.

..   *Most placable.*—Being most placable.

.,   *Truculent.*—Fierce.

,,   *At home.*—In his own country:

,,   *His bark is worse than his bite.*—(This applies primarily to a dog that barks a great deal and gives one the idea of being very fierce ; but, after all, it does not bite.) He threatens and blusters, but does not execute his threats

,,   *For the purposes of neighbourhood.*—Qualities helping to make him very friendly with those near whom he is living.

,,   *Sobriety of judgment.*—Cool, practical judgment. This sobriety is opposed to impulsiveness.

,,   *Logic.*—Reason.

,,   *Which passion, &c.*—Which is not overcome by strong impulses.

,,   *Cloud* --(Verb.) Darken.

,,   *Good-fellowship.*—Friendly behaviour.

,,   *Spring.*—Fountain, constant source.

,,   *Colony.*—(L. *colo* to cultivate.) A body of people who have left their mother country to cultivate and inhabit some other country.

  Do not move at all.—Do not go out of their country to settle in any other.

  Jostling.—Knocking up against.

Page.

235. *To leave the people alone.*—Infinitive sentence, in apposition to the pronoun "this."

    ,, *A free action, a clear stage.*—Elliptical for "allow them a free action, a clear stage."

    ,, *A clear stage.*—A stage is a platform on which actors perform in a theatre. "A clear stage," that is to say, a stage from which all the hindrances to free movement are taken out of the way, means opportunity for unimpeded action.

    ,, *The less he initiates.*—The fewer things he begins for the people.

    ,, *Emergencies.*—Special occasions of difficulty.

    ,, *Organizing.*—Arranging things ; reducing them to system.

    ,, *Private enterprises.*—Undertakings by the people themselves, not by the State

236. *Waterloo bridge.*—One of the bridges over the Thames in London It was built by John Rennie at a cost of a million of pounds sterling. It was opened in 1817.

    ,, *Before this.*—Before this generation.

    ,, *Built by shares.*—The money expended in its erection was subscribed for by means of shares taken by different private people. The Government did not build it.

    ,, *Private spirit.*—Private energy.

    ,, *Status*—(A Latin word.) Recognized position.

    ,, *A famine threatens.*—(The indicative is here used instead of the hypothetical subjunctive for the sake of vividness.) If a famine should threaten. (Parse "threaten" as an intransitive verb.)

    ,, *Any meddling.*—Noun in apposition to "one thing."

    ,, *Emigration is in vogue.*—(Here too the indicative is used for the sake of vividness.) If emigration should be in vogue.

    ,, *In vogue.*—Popular.

Page.

236. *Out go swarms.*—Emphatic for " swarms go out."

„   *Prytaneum* —This was the town-hall of a Greek
state. It was regarded as the common home of
the inhabitants of the State or city. A perpetual
fire was kept burning here. From the ever-burn-
ing fire of the prytaneum, or home of the mother-
state, was carried the sacred fire which was to be
kept burning in the prytanea of her colonies ; and,
if the fire in the prytaneum of any colony was
ever extinguished, the flame had to be rekindled
from the prytaneum of the mother city.

„   *Under state guidance and with religious rites.*—
Among the ancient Greeks a colony was usually
sent out with the approbation of the mother coun-
try, and under the management of a leader ap-
pointed by the State.

„   *Make the hazard of a raft.*—Take the risk of an
attempt to get to the mainland on a raft.

„   *Subserves the rest.*—Renders service to all the others.

„   *Takes care of number one.*—Takes care of himself.

„   *The desert beach.*—The sea-shore, which a short time
ago was uninhabited.

„   *Extending their connexions.*—Extending their busi-
ness.

„   *Up the country* —Into the interior of the country.

„   *A company of merchants.*—The historical fact that
'the writer has in his mind's eye in this description,
is the establishment of the East India Company
in this country, which was a company of mer-
chants trading to the East Indies.

„   *They need a better defence, &c.*—This is a true descrip-
tion of the condition of the English merchants
both at Madras and Calcutta.

„   *A youth.*—Lord Clive, who came out to this country
as a mere youth, in the capacity of a writer. He
first distinguished himself at the seige of Arcot,
and ended with gaining the battle of Plassey in

1757, from which time may be dated the establishment of the British empire in India.

236, *Over the graves.*—Over the extinguished power.

., *Mahmood and Aurungzebe.*—Representative names, used to indicate the Mahomedan power generally. (Mahmood was the founder of the Gauzni dynasty. His territory extended from the Ganges to the Caspian Sea. Born 997, died 1030. Aurungzebe, known as the Great Mogul, belonged to the dynasty of Timur. He greatly enlarged his dominions. He was the last of the energetic sovereigns who sat on the Mogul throne during the 17th century.)

., *Mylords.*—My lords. (The common designation of Englishmen on the continent of Europe, who are all of them supposed to be " My lords."

,, *The natives*—The people of the country in which he happens to be.

,, *Raising a colossus.* — (A colossus is a statue of a gigantic size. It is often, however, used to designate anything very large, as for example, a colossal fortune) Making a great fortune for himself, or establishing an important trade, or succeeding in any similar large enterprise.

,, *Setting the Thames on fire.*—A colloquial phrase used to describe any very wonderful achievement.

237, *Andes.*—Mountains in South America.

., *Diving-bell.*—A hollow vessel shaped like a cone, in which a person may descend into deep-water and remain there as long as the enclosed air, continues fit to be breathed.

,, *Timbuctoo.*—A town in the heart of Africa, far removed from all civilization.

,, *Grubbing.*—Digging about, in the hope of finding relics of antiquity.

.,, *The Pyramids.*—(Gr. *pur* fire, from the shape of the pyramid resembling a flame of fire, tapering to a point.) Monuments existing in Egypt to the

Page.

present time, built by the ancient kings of that country for sepulchral and religious purposes.

237. *Scouring over.*—Riding on horse-back over.

,, *The Pampas.*—(Plural number.) Name given to prairies in the southern part of Buenos Ayres in South America.

., *Dahomey.*—A Negro kingdom in Africa, founded in 1625 The people have been noted for their savage attacks on the white settlements in the coast.

,, *Smoking the pipe of friendship*—A phrase common among the Indian tribes of North America. The smoking of a pipe in company with another was a token of friendship being established between them.

,, *Red Indians.*—A tribe of American Indians, so called from the color of their skin.

,, *Hutting.*—Erecting a hut to live in in the Arctic regions where the seas are all frozen during the winter months.

,, *Sometimes failure, &c.*—Supply the verb "happens" or "happen" to the nouns forming this sentence, which has been purposely left without a predicate for the sake of rhetorical effect.

,, *But it is he, &c.*—The results, as above enumerated, whatever they may be, are owing to the individual qualities, not to any State influence or co-operation.

,, *Multitudinous enterprise.*—Many undertakings of all kinds.

,, *Prowess.*—Skill.

_____

HELPS.

ARTHUR HELPS, a distinguished essayist and historian, was born in 1817.

His first works were " Essays written in the Intervals of Business," "Catherine Douglas" a tragedy, and " King Henry the Second," an historical drama "Friends in Council" was published in 1845, and its sequel, "Companion of my solitude," appeared some years after. All his works were published anonymously.

Page.

After having taken his B. A. at Cambridge, he entered the Civil Service, but after some years he retired to his estate near Bishop's Waltham in Hampshire. There he published his greatest work entitled " The Spanish Conquest in America, and its Relations to the History of Slavery."

241. *Qualities of a moral nature* —Elements of character.

,, *A potent charm.*— A powerful spell or influence.

,, *Entanglements.*—Temptations, perplexities.

,, *In the most worldly sense.*—In the sense of prosperity and reputation.

,, *Of error.*—Of making a mistake.

,, *Conduces.*— Helps.

,, *Correspondences.*—The points in which goodness and wisdom resemble one another.

,, *Are a perpetual exercise of the faculties of those.*— Are constantly exercising the minds of those.

,, *And a deep interest, &c.*—And where the heart or moral nature of a man is interested, or feels an interest in these questions, the result is that the understanding or intellect of that man is better cultivated.

,. *Excitement.*—Inducement to improve one's mind.

,, *Girt about.*—To gird, is to make fast by binding ; hence, to surround. It then comes to mean, to equip or to clothe.) Equipped, clothed, armed, furnished. " Knowledge being girt about with power " means, that a man's knowledge gives him power. In the same way, a man's goodness of character makes him wise.

,. *Principles* —Right rules of action.

,, *On the sea of action.*—(Metaphor.) " Into circumstances " when every body is acting all around him and he is compelled to act for himself.

,, *Without rudder and compass.*—(The metaphor of a " sea of action " is here kept up. A man beginning business, is like a ship putting out to sea ; and a man going out into business without proper principles to guide him, is like a ship that has no *rud-*

der to guide it and no *compass* on board to indicate the direction in which it is going.

244. *They are the best results of study.*—The best thing a man can get as the fruit of his study, is not the mere accumulation of knowledge, but the acquaintance with those principles which will best guide his conduct through life.

,, *The facts, &c.*—The circumstances that happen to a man very often

245. *Hopeful.*—That is, his temperament or prevailing disposition should be hopeful. He should be full of hope, and not too ready to expect disappointment or to despair.

,, *Lose his head.*—Get confused.

,, *Wished-for* —(Parse as one word.) "A participial adjective.

,, *The calm and the hopeful.*—(Parse "calm" and "hopeful" as nouns) The quality of calmness and the quality of hopefulness.

,, *Provide against.*—Correct.

,, *Until it is actually wanted.*—Until the moment arives when it is necessary that some decision should be come to.

,, *Be within call.*—Be ready.

,, *And does not judge so much.*—What is necessary to enable a man of business to come to a decision on any point is not so much that he should be able to form a faultless judgment, as that he should be able to tell from present circumstances what is likely to happen hereafter, and so make up his mind what to do.

,, *Not technical.*—Not belonging to any particular profession.

,, *Something like universality.*—A course of study that will embrace all kinds of subjects.

,, *Various classes of facts.*—Facts belonging to all departments or branches of knowledge.

245. *Metaphysical.*—Appertaining to the science of the mind. (Gr. *meta* after, and *phusike* nature. Aristotle having already spent his best years on *physics,* or the science of natural bodies, he turned afterwards (*meta*) to the subject of the mind.)

„ *Soften the transition from.*—Make it easy to pass from.

246. *The world.*—Active life.

„ *Remote from.*—Having little direct bearing upon.

„ *Can be woven into.*—Can be made to help one another so as to produce.

„ *Bacon.*—See note on "Bacon" at page 225 of the text book

„ *O..ler.*—Arrangement of his thoughts.

„ *Grasp.*—Mastery; thorough understanding.

„ *Given out.*—Disclosed.

„ *His purposes.*—The aims he sets before himself in his writing.

„ *Anything of human interest* —Anything that affects the welfare of men generally.

„ *To form.*—To shape; to fit.

„ *It is not however, &c.*—This sentence is elliptical. To complete it, add after the words "studying it," some such clause, as—" that is of principal importance."

„ *Our student.*—Such a student as that of whom we are speaking.

„ *Not a "full man," &c.*—The reference in the quotations is to the well known aphorism of Bacon — " Reading makes a full man, writing a correct man, and speaking a ready man."

„ *Digests.*—Summaries.

„ *Order of their following.*—The order in which they ought to follow one another.

„ *Rude.*—Crude, imperfect.

246. *By such a result.*—By the development of method.

,, *Developed.*—Brought out.

,, *This will be one, &c* —The man who will be able to speak to others with most profit, will be the man who has acquired method in the arrangement of his thoughts.

,, *Fluency.*—(L. *fluo* to flow) Ease of expression.

247. *A close repetition, &c.*—In literary competitions such repetitions are avoided as making the style heavy and inelegant But where clearness and precision are of paramount importance, it is not necessary to try and avoid repetitions.

,, *Consummate.*—Perfect.

,, *Encumber him.*—Burden him ; make it difficult for him to act.

,, *Stout*—Brave.

,, *A disciplined imagination.*—An imagination accustomed to be controlled and not likely to carry him away into impracticable undertakings

,, *The strength of repose.*—The calmness and restfulness of the man who knows that he is strong.

,, *The vitality.*—The power to live.

,, *Should be.*—He should be.

,, *Will endow him with diligence, &c.*—Will make him diligent, &c. .

,, *Requisites.*—(" Requisite " is properly an adjective. Here it is a noun in the plural number.) Things requisite.

,, *All the rest.*—Patience, courage, calmness, hopefulness, &o.

,, *Translated.*—(L. *trans* across, and *latum* to carry, carried across) Turned into.

KINGSLEY.

CHARLES KINGSLEY, a distinguished novelist and essayist, was born at Holm Vicarage, Devonshire, in 1819. At the age of fourteen, he became a pupil of the Revd Derwent Coleridge, and soon afterwards went to Cambridge, where he distinguished himself in classics and mathematics. In 1842, he was appointed curate of Eversley, in Hampshire, and, soon after, succeeded to the living. About this time, he married a daughter of Mr. Grenfeld, member of Parliament for Truro and Great Marlow. His first writings were "Village Sermons," "The Saint's Tragedy," and "Alton Locke." His principal works were "Hypatia," "Westward Ho,' and "Two Years Ago." Among his more important religious writings are "The Message of the Church to Labouring Men," "Sermons on National Subjects,' and "Sermons for the Times." He wrote also for Fraser's Magazine, the "North British Review," and the "Encyclopedia Britannica.' Among his latest efforts was a Preface to an Illustrated Edition of Bunyan's Pilgrim's Progress."

251. *Arica.*—A seat-port town in Southern Peru, on the coast of the Pacific. The earthquake at Arica began on the 13th August, and continued till the 19th August 1868.

,, *The Illustrated London News.*—A weekly journal published in London, containing pictures and illustrations of scenes and events of current interest, and likenesses of men of note.

,, *Mothers—children.*—Nouns in apposition to "people."

,, *Answer you that.*—Answer you that question.

,, *A child of God.*—As God is the Father of all men, every person is, in that sense, a child of God.

,, *Cleverer.*—The comparative degree is used to suggest the comparison between men and the lower animals.

,, *Ape.*—In apposition to "animal."

,, *The natural science.*—(The abstract put for the concrete.) All the natural sciences, that is, the sciences that treat of the various objects in nature, such as botany, astronomy, geology, physics, chemistry, &c.

,, *Besides.*—Adverb qualifying "know."

16

251. *Lady Why.*—(Personification. **A** spirit of inquiry the desire to know the reason of things.

,, *Somewhere.*—At sometime.

,, *Thirst.*—Desir·

,, *There.*—An exclamation.

,, *I think.*—The verb expresses an opinion, not a certainty.

,, *Hard.*—Severe in my judgment.

,, *Staking.*—(The noun "stake," which is really only a participial form of the verb to "stick," properly means any thing that is *stuck* or *fixed* in the ground. It is used metaphorically to signify a risk, hazard, or wager, which is something *fixed* or employed to answer an event. Hence the verb "to stake," means to wager, to risk something on the happening of a certain event.) Risking.

,, *While they ought to have known.*—The allusion here is to the fact, that earthquakes of the most violent and destructive kinds are of frequent occurrence on the western coast of South America. Among the more recent earthquakes may be mentioned the earthquake that destroyed several towns of Chili, in 1835; the earthquake that destroyed the city of Cumana, in Venezuela in 1853; the earthquake of 1854, in which San Salvador was overwhelmed with a fourth of its inhabitants; the earthquake of 1859 that reduced Quito to ruins, and the earthquake in 1861; in which the city of Mendoza was destroyed.

,, *The parable.*--A parable is a fictitious representation of something real in life, and always has a moral lesson attached to it. It differs from a fable in this, that the representations of the latter are of a kind that cannot possibly take place in real life, such as conversations among different animals, &c.

255. *Do-as-you-likes.*—A fancy name intended to designate people who like to act according to their own pleasure. (Parse as a proper noun in the plural number.)

Page.

255. *The burning mountain.* — The volcanic mountain, such as Vesuvius, under which stood the ancient Roman cities of Herculaneum and Pompeii, which were suddenly overwhelmed by the burning lava which poured out of the centre of the mountain in one of its eruptions.

„ *The top*—Of the mountain.

„ *Slag.*—The lava or matter thrown up by a volcanic mountain when it is in eruption.

„ *Especially if they* —("They" has for its antecedent "any one." Grammatically, this is incorrect "Any one" being in the singular number, ought to have the singular pronoun " he." The plural pronoun, however, is in very common use.

„ *Many a year.*—This use of a plural adjective before a singular noun is idiomatic. Various explanations of the idiom have been attempted. The mistake lies in supposing, that the word "a" is the indefinite article. It is not. It is a corruption of the preposition " of," as in Thomas *a* Becket, which properly is Thomas *of* Becket. So here, "many a year" really means "many of year," that is to say, "many of the space or period of time called year."

„ *Madam How* —(Personification.) Questionings as to the manner of things.

„ *That he did not intend, &c.*—A noun sentence in apposition to " one thing."

„ *Rough fashion.*—Rude way.

„ *To quit.*—To leave the house.

„ *Spanish Americans* —Spaniards, who have for many generations settled in South America.

„ *Landlord of landlords.*—God.

„ *To quit.*—To leave the place.

„ *The Andes.*—A chain of mountains in Southern America.

„ *Become.*- -Might become.

Page.

255. *Not over-good* —(This is a sort of euphuism, in which the idea intended to be conveyed is clothed in a softened form.) Not too good, that is, bad.

„ *The eastern part.*—The eastern coast of South America.

„ *Their own land.*- -South America is called their own land, because they left the parent country many generations ago, and adopted this land as their country.

„ *A paradise.*—A beautiful garden. (The name primarily designates the Garden of Eden, in which our first parents, Adam and Eve, were placed. That garden is supposed to have been perfect in its beauty ; hence, any place that is particularly luxuriant in its beauty, is called a paradise.

„ *Precious woods.*—Timbers of great value in the extensive forests.

„ *Drugs.*—Substances used for medicinal purposes.

„ *Boundless wealth, in one word.*—In one word, boundless wealth.

„ *Amazon.*—The great river of South America and the largest river in the world. It extends about 4,000 miles and drains an area of two millions of square miles.

„ *The old world.*—The Eastern Hemisphere.

256. *Instead of being what they have been.*—Instead of these gifts of God being allowed to be waste. Instead of being the neglected gifts they have been.

„ *The voice of God, &c.*—Noun in apposition to " warning."

„ *Find out that.*—Find out what makes earthquakes.

„ *Try the very simplest cause.*—Let us try and see if the simplest cause we can think of will fully explain earthquakes.

„ *Think............* —These dots following the word " think " are intended to suggest to the reader, that there is silence immediately after this word

is spoken, time being here allowed by the speaker to enable the child to whom he is speaking to think.

256. *Flask.*—A small vessel in which gunpowder is kept.

,, *Still more.*—Particularly.

,, *Boiler.*—Metal cylinder in which the water is boiled, that furnishes the steam by which the engine is made to go.

,, *Explosion.*—Bursting.

,, *Hartford Bridge Flat.*—A flat is a shoal formed just below the surface of the water: an extent of land that has risen up, like a sand bank out of the water. This Hartford Bridge Flat on the seacoast is of this description, and is the result of volcanic action.

257 *Charles Selwyn.*—A comedian.

,, *Pyrenees.*—Mountains that separate France from Spain.

,, *Polished rock.*—The rock had been polished or rendered smooth by the constant flowing of the water.

,, *Poured.*—Has for its subject "stream."

,, *Large enough to turn a mill.*—Mills are common in Europe and elsewhere for the grinding of corn, &c., the machinery of which is set in motion by a large wheel, which stands in the water of a fast-flowing stream or river, and which is turned by the force of the current.

,, *Box.*—A kind of tree.

,, *Musky.*—Like the smell of musk.

,, *Spring air.*—Air of the season known as spring, so called, because it is the season immediately after the winter, when the new leaves spring forth, and the earth is once again clothed with green.

,, *Boulders.*—Loose masses of rock.

,, *Hepaticas.*—The name of a plant more commonly known as liverwort.

Page.

257.　*Little stars.*—So called from the shape of the flower of the gentian.

　　,,　*Gentian.*—The name of a plant.

　　,,　*Azure.*—Blue.

　　,,　*Silver firs.*—A variety of fir, so called from the silvery appearance of the foliage.

　　,,　*Saw-edge*—Edge, like that of a saw, which is an instrument with teeth used in cutting wood.

　　,,　*The head of the valley.*—The further end of the valley when the mountains closed in upon it.

　　,,　*Cones*—Pointed peaks.

　　,,　*Virgin snow.*—(Parse " virgin " as an adjective) Pure, untouched snow.

　　,,　*Into the air.*—It would have been equally correct to have said " in the air," nevertheless the shades of meaning in the two expressions are different. " Seven thousand feet in the air " would mean, that that height was the station these cones of snow *occupied*. " Into the air " means, that seven thousand feet was the height *to* which in their upward progress they had *reached*.

　　,,　*Fade*—Has for its nominative " sides."

　　,,　*Begins the dream.*—Suggests or causes the dream.

258.　*Quicker.*—(Comparative adverb.) More quickly.

　　,,　*The driver.*—The man who drove the travelling coach.

　　,,　*The secret.*—The reason why no one would say that it was an earthquake.

　　,,　*Was out.*—Was disclosed.

　　,,　*Limestone.*—A kind of rock. All marble is limestone, though it may be of different colours.

　　,,　*They were replaced by granite.*—Instead of the limestone there was granite.

　　,,　*Granite.*—An igneous rock, so called, because it is the result of fusion by the internal fire of the

Page.

earth. It is composed of three different kinds of rocks or minerals, quartz, feldspar and mica.

258. *London Bridge.*—The name of one of the bridges over the Thames in London.

,, *Aberdeen.*—A town in Scotland.

259. *Never in granite.*—Because granite is a much harder rock than limestone.

,. *Cold springs.*—Springs giving forth cold water.

,, *Hot springs.*—Springs giving forth hot water.

,, *Chemical salts*—Alkaline or earthy substances compounded with an acid The kinds of salts differ according to the kind of rock through which the water flows.

,, *As at lifted it up.*—Granite forces its way in a state of fusion through the earth's crust, and so lifts up what it meets with in its way.

,, *The rock above it*—The limestone.

,, *Jets*—Long shoots of water.

,, *The wise man of old.*—("Of old" means, "of old times.' Parse "old" as a noun.) The prophet Jeremiah. He is called wise, because he had gained wisdom by studying the will and the ways of God.

,, *"It is of the Lord's mercies,"* &c.—This is a quotation from the Bible: see Lamentations III; v.22.

,, *On board a ship.*—"A" is not the indefinite article, but a corruption of "of." On board of ship.

,, *The steeples*—(A steeple is a turret ending in a point.) The steeples of churches where the bells are usually hung.

,, *Quaintly enough.*—"Enough" is here used merely as an intransitive.) Very quaintly.

,, *Slam.*—A violent shutting.

,, *Timbers.*—Planks, beams, &c.

Page.

259. *Frights.*—(Used in the singular number, this word conveys the idea of a *condition* of fear; used in the plural, it means *occasions* of fear.

,, *Dock-keepers.*—Men engaged to keep watch at the docks, which are deep trenches dug on the bank of a river or on the side of a harbour, in which ships are built and where they are put in for repairs.

,, *Liverpool.*—A town in the north-west of England, and a place that has long been noted for the building of ships.

,, *The earthquake in* 1863.—This earthquake was felt through the western portion of England on the 6th of October 1863.

,, *Rock down.*—Rock houses until they fall.

,, *What a town looks like.*—~~Like a town looks.~~

,, *Darken.*—(Metaphor) Render sorrowful.

,, *Eddy.*—Turn round and round.

,, *A teetotum.*—(A child's top.) Something like a top which is twirled by the fingers.

,, *Billiard-balls.*—Ivory balls used on a billiard table.

,, *And that.*—The last one.

,, *The end one.*—Parse " end " as an adjective.

261. *You must watch Madam How at work on little and common things.*—You must watch how little and common things are brought about by Madam How.

,, *Rare.*—Of unusual occurrence.

,, *Solomon.*—King of Israel, and son and successor of King David. He ascended the throne of his father at Jerusalem in 1015 B. C. His reign was an eminently prosperous and peaceful one. He was noted for his wisdom. Died in 975 B. C.

,, *A fool's eyes, &c.*—This is a quotation from the Bible. The passage will be found in the book called the Proverbs of Solomon, chapter XVII, verse 24.

261. *If he saw.*—" Saw " has for its object " which."

,, *About his feet.*—On the ground around him.

,, *The wash.*—The sweeping up.

,, *The offing.*—That part of the sea that is at a good distance from the shore, and where there is deep water.

,, *Comes*—Has for its subject, " a mighty wall of water."

,, *Sweeps* —Advances with sweeping motion.

,, *Quays.*—(Pronounce *kees.*) A bank formed toward the sea for the purpose of loading and unloading vessels.

,, *Carrying great ships in.*—By " in " is meant inland.

,, *And on to the land.*—Parse " on " as an adverb. It has the meaning here of " onwards."

,, *India-rubber.*—This substance is also known as *caoutchouc*. It is an elastic gum, and was first introduced in Europe from South America in the year 1733.

262. *Would rise out of the water.*—Because air is lighter than water.

,, *Basin or tub*—Containing the water in which the ball had been placed.

,, *Imprisoned.*—Not able to make its escape.

,, *Chasm.*—Great gaps of splits.

,, *Rush.*—The subjects of this predicate are " steam," " gases," " hot water," " mud," " flame," " strange stones."

,, *All signs.*—(" All " does not qualify " signs," but the " steam," " gases," &c., above enumerated) All (those things mentioned above) being signs.

,, *The greater boiler.*—Not an actual boiler, but the space in which the steam or gas was confined.

,, *The strain is eased* —The strain becomes less.

,, *All before it.*—Every thing that is in its way.

Page.

263. *Its work fresh done.*—The effects still recent.

" *The 'how' of them.*—(Parse "how" as a noun in the objective case governed by "understanding.") The manner in which they happen.

" *May set your hearts at rest on that point*—May be sure that such a thing will never happen.

" *Goes back.*—In point of time.

" *Devonshire.*—A country on the south-west coast of England.

" *The Severn valley.*—The extent of country along which the river Severn flows.

" *Cheshire.*—One of the western counties of England.

" *Lancashire.*—A maritime country of England, stretching along the bay of the Irish Channel in the north-west coast.

" *Long before man lived on the earth.*—It is one of the facts established by the science of geology, that the earth existed and underwent many marvellous changes, ages and ages before man was created.

" *Tilting.*—Lifting up of one side, so as to move the layers out of their horizontal position.

" *Layers of rock.*—Rocks spread out one over the other. (The rocks that lie in these layers, or strata as they are called (which is the plural of stratum), were formed under the action of water, and are hence called aqueous (L. *aqua* water) rocks. They were formed in the same way as the layers of sand on the bank of a river are formed, one lying over the other. These layers in process of time got hardened and became the strata of rocks of different kinds that are to be met with in mountainous regions.

" *Ramsgate.*—A sea-port town in the county of Kent in the south-east of England.

" *The earthquake force.*—Parse "earthquake" as an adjective. Shaky, or trembling force.

(192)

Page.

where the sea-shells are found was not at that time above the high-water mark.)

264 *And how.*—And I have shown you how.

,, *Gullies.*—Channels or hollows worn out in the earth by the flowing of water.

,, *Live.*—(Adjective) Alive ; living. (Pronounce the *i* long.)

,, *Pholases.*—A kind of small insects.

,, *Boring into.*—Making holes into.

,, *Peat* —A substance between decomposed vegetable matter and completely black vegetable mould.

,, *Fed over.*—Grazed upon.

,, *Giant oxen, &c.*—In the old geologic eras before man, the earth was inhabited by animals of gigantic size, altogether different from the kind of animals that now inhabit it.

,, *Mammoth* —An extinct species of elephant, thickly covered with hair.

,, *Gravelly bottom of the sea.*—Bed of the sea composed of gravel.

266. *One stay.*—One state or condition

,, *Solid-seeming earth.*—Earth which seems solid.

,, *Heaving.*—Moving up and down.

,, *Is One.*—God.

,, *Yesterday.*—Past time

,, *Peruvians.*—The people of Peru, in South America.

,, *True.*—That is true.

,, *Time.*—Objective case, governed by the preposition "at" understood.

ARNOLD.

MATHEW ARNOLD is the son of the celebrated Dr. Arnold of Rugby. He was formerly Professor of Poetry at the University of Oxford. He has written several books, the tendency of most of which has been to encourage free-thinking in a modified form.

A French School.

Page.

270. *On a par.*—Equal to ; on a level with.

,, *Not so good.*—Was not so good.

,, *The arithmetic in particular being in general.*—Particularly the arithmetic being generally, &c.

,, *Apprehended.*—Understood.

,, *The information.*— The knowledge the pupils possess.

ENGLISH AND FRENCH CHARACTERISTICS ; ENERGY OF INTELLECT AND FLEXIBILITY OF INTELLECT.

,, *The moral sphere, the intellectual and spiritual spheres.*—By the moral sphere, is meant, moral conduct, that is, conduct in respect to right and wrong. By the intellectual sphere, is meant, the activities of the intellect or understanding. By the spiritual sphere, is meant, those higher thoughts and feelings that have reference to realities that are apprehended by our spiritual nature. The writer applies the term "spiritual" to will, energy, and such mental qualities as are neither strictly intellectual nor distinctively moral.

,, *Fruitful qualities*—Qualities that produce many good results

,, *Genius.*—This word is generally used in the sense of special natural aptitude. Sir Joshua Reynolds however, for example, maintained that drudgery was genius ; by which he meant, that any man could gain success in any department of intellect, who only applied himself to it with persistent industry and energy.

,, *At all.*—Parse as an adverb qualifying "eminent.".

,, *Openness of mind*—Candour.

,, *Flexibility of intelligence.*—(Flexibility—L. *flecto* to bend—means, readiness to bend.) Intelligence that readily bends to any subject. There are some minds that can be interested in, and can pursue, some subjects, but cannot bend to others ; but a man who has a flexible mind, is a mind who can turn at will to any subject and master it.

Page.

270. *Relegate* —Send back. Maintain that genius belongs to the moral nature of a man and not to his intellectual.

" *Its probable special time of successful activity.*—The direction in which it is most likely to succeed.

" *Imperfections and failings* —In the objective case governed by "indicate."

" *In this sphere.*—That is to say, when genius develops intellectually

" *An affair.*—A matter.

" *Poetry.*—(Gr *poier* to make) The creations of imagination.

271. *Shakspeare.*—As representing the poetical genius of the English nation.

" *The highest reach of science* —The highest point to which science can take a man, is to create in him the power of inventing things.

" *A faculty of divination.* —(L. *divus* a god.) The power of telling beforehand what will take place under certain conditions, and hence the power of adapting means to an end which it is foreseen will result. Thus Watt invented the steam-engine by his power to foretell what effects would be produced if he put certain forces into a given relation to one another. So with all inventors. (The ancients meant by divination, the inspiration of a god.) This power of creating in the world of science corresponds to the power of imagination in poetry, that creates new scenes and circumstances

" *Newton.*—As representing the scientific genius of the English people. (Sir Isaac Newton, the greatest of English philosophers, born in 1642, and died in 1727, was the discoverer of the doctrine of the "Attraction of Gravity." This principle forms the foundation of the Newtonian philosophy, and is treated of at length in his " Philosophiæ Naturalis Principia Mathematica." He was appointed Mathe

matical Professor at Cambridge. In 1704, he
published his "Reflections, Refractions, Inflections
and Colours of Light," which was translated into
several languages. He also wrote a treatise on
"Ancient Chronology." His modesty, notwithstand-
ing his great scientific attainments, was apparent
in the following words spoken on his deathbed :
"I know not why I may appear to the world ; but
to myself, I seem to have been only like a boy
playing on the sea-shore, and diverting myself
in now and then finding a smoother pebble, or a
prettier shell than ordinary, whilst the great ocean
of truth lay all undiscovered before me."

271. *Demands and insists upon.*—These verbs have for
their subject "that energy." What that energy
demands and insists upon, above every thing, is
freedom. Men must be left free to exert them-
selves in any direction they please ; otherwise no
genius will ever be developed.

„ *Independence*—Noun in apposition to "freedom."

„ *Prescription and routine*—(In the objective case
governed by the preposition "of.") Independence
of, *i. e*, freedom from authority, from prescription
and from routine. "Prescription" (L *præ* before,
and *scribo* to write,) is any thing written down be-
forehand for guidance or direction. Hence, rule,
directions. "Routine" (pronounce *rooteen*) is used
in the sense of a regular and uniform course of
practice.

„ *As it will.*—(Subjunctive mood, from the verb to
will) As it pleases.

„ *Authority.*—Noun in apposition to "standard."

„ *Academy*—(The academia was a piece of land not
far from Athens, originally belonging to the hero
Academus, which was adorned with palm and olive
plantations, and works of art. Here Plato used
to teach.) An association of artists for mutual
improvement.

Page.

271. *As we have seen.*—The allusion is to Shakespeare and
Newton.

,, *Requisites* —(Noun) Things required.

,, *The affair of quickness, &c.*—Have concern with, are
dependent on quickness of mind, &c.

,, *Quickness of mind.*—Quickness in understanding
things.

,, *Flexibility of intelligence.*—Readiness of the mind
to adapt itself to different subjects, and be equally
interested in them all.

,, *Method of evolution.*—(L. *e* out, and *volvo* to roll, to
open out or unfold.) The manner of opening out
or working out the main idea in an intellectual
work.

,, *Precision* —Exactness of language in description.

,, *The proportions* —The relative importance to be given
to the several ideas which, combined, are intended
to make up the intellectual work.

,, *Intellectual work.*—A work of the intellect. (Such
for example, as Newton's Principia, where the main
principle enforced is the centre of gravity, to
which all other departments of knowledge are in
different proportions made subservient So with
any of Shakspeare's great plays, or Milton's Para-
dise Lost, &c.

,, *Upon them.*—Upon quickness of mind and flexibility
of intelligence.

,, *Are most communicable from it.*—(Form, method of
evolution, precision, proportion, relations of the
part to the whole,—these things are most easily
communicated, that is, taught, by means of the in-
tellectual work itself, which shows these things in
itself) Able to be communicated or taught to
others from their seeing the intellectual work
itself.

,, *The intellectual performance of others.*—The way in
which others set about their intellectual work when

Page.

they have any   Thus, many a later author study-
ing the " form, method of evolution," &c., of
great authors that have gone before, whose " in-
tellectual work" is often taken as a model on which
the " intellectual work " of later writers is con-
structed

271. *The gifts on which they depend.*—The quickness of
mind and flexibility of intelligence without which
" there cannot be form, method of evolution," &c.

,,   *Shortcoming.*—Defect.

,,   *Energy* —(Gr *en* and *ergon* work)   Inherent vigor
of thought.

,,   *The first thing.*—The chief thing. The reason why
the qualities spoken of are said to be more import-
ant in prose than in poetry is, that there must al-
ways be more of the logical and didactic element
in prose than in poetry, which is mainly dependent,
not on logical reasoning, but on the activity of
the imagination.

,,   *With no particular gifts for these.*—With no special
natural aptitude, *i. e.*, no quickness and flexibility
called " gifts " (because they are suppo. to have
been given by God to some men when He created
them. and not to have been acquired) " for," *i.e.*,
by means of which, ' these," *i. e.*, the requisites
above enumerated, may be acquired.

,,   *Appropriated.*—(L. *ad* to, and *proprius* one's own.
Fr. *approprier*.)   Turned to one's own use.

,,   *Cannot* —Cannot be acquired by another person.
One man's method, &c., may be learnt by another
man. provided this latter has quickness of mind
or flexibility of intelligence; but one man cannot
acquire the genius of another.

,,   *Our nation.*—The English.

,,   *Its spirit.*—The spirit (as distinguished from the
intellect) of the English nation.

,,   *In the qualities of genius than in the qualities of in-*

MAX MÜLLER.

Max Müller.— A living author and well known orientalist.

The Life of Buddha.

272   *Buddha.*—The founder of the religious system known as Buddhism. Buddhism was long the prevailing religion of India. According to Sir. William Jones, it was introduced into this country in B. C. 1000, although many people, who have studied the question, incline to accept the traditional account of its introduction by Gautama or Gadama about B. C. 500. A feud having arisen between the Buddhists and Brahmans, the former were expelled from the greater part of of Hindoostan. Buddhism, however, remains the

prevailing religion of Ceylon, China, Japan, Burmah and other parts of Asia. Buddhism is an essentially moral system ; it has little or no ritual, and its chief doctrines are,—that there is pain, that pain is caused by desire, and that pain can only be ended by *Nirvana* ; by which word annihilation is supposed to be meant.

272. *Spiritual relationsh p* —The relationship of a disciple.

,, *Kshatriya.* —Hindu society is divided into four great classes or castes .—The Brahmans or priests ; the Kshatriyas or warrior class : the Vaisyas or mercantile class, and the Sudras or servile class.

,, *Dates, &c.*—That is to say, Buddha was not so called till the later period of his life. (Parse "dates" as an intransitive verb.

273. *To marry him.*—(This verb is sometimes used as a transitive verb, as when a man is said to marry a woman. And it is also used in a causative sense, and means to cause to marry, as *A* married his son to *B's* daughter) To make him marry.

,, *The future heir to the throne.*—Suddhartha or Buddha.

,, *For reflection.*—To be able to consider the matter.

,, *The royal suitor.*—Suddhartha, who is so called because he was suing for the hand of the princess.

,, *Happiest,*—Marriages understood

,, *Problems.*—Difficult questions which have not been settled.

,, *Lyre.*—A stringed instrument, like a harp.

,, *The wise man.*—Any person who is wise.

,, *Rest.*—Rest from change.

,, *Bring light to man.*—Teach men what life really is.

,, *Free.*--Free from the constant changes of condition incidental to human life.

Page.

273. *Melancholy.*—(Gr. *melas* black and *chole* bile, black bile) A gloomy state of mind.

,, *Speculations.*—Inquiries ,

,, *Retinue.*—(From the verb to retain.) Followers.

,, *Decrepit.*—Worn down with age.

., *Bald.*—He was bald.

,, *Bent on his stick* —Leaning on his stick.

,, *Is there something peculiar* — Is this condition in which he appears owing to something peculiar.

., *Obtuse.*—Blunted, dull

271. *Is defeated by.*—Is overcome by, is made to yield to.

,, *Intoxicated.*—(The Greek word *toxon* is an arrow, and as arrows in ancient warfare used to be poisoned. *toxicum* came to mean poison. To intoxicate properly therefore means to poison. The word is usually employed to losing one's right senses under the influence of spirituous liquors or such drugs as opium, &c. Metaphorically, it means to excite unduly.) A person is said to be intoxicated by his youth when he is unreasonably conceited about it.

,, *Prey* —Noun in apposition to "I."

,, *Parched.*—Dried up ; suffering from intense thirst.

,, *Bier.*—A frame on which the dead are carried.

,, *If these could be made captive for ever.*—If old age, disease, and death could be imprisoned, so that they should not be free to go about and attack men.

,, *Mendicant.*—Beggar.

,, *Outwardly.*—To all appearance.

,, *Subdued.*—Quiet in his manner ; not noisy.

,, *Vestment.*—Garment.

275. *Austerity.*—Severe self-denial as to bodily comforts and ease.

,, *Devotee.*—One who devotes himself, entirely to religious duties.

HUNTER

WILLIAM HUNTER, LL. D., is a member of the Indian Civil Ser-
vice He is the author of "Annals of Rural Bengal, and has
been engaged for some time on a *Gazetteer* of India

which was confirmed by Charles II in 1661, and again in 1667. In 1694, the East India trade was thrown open, but in 1698, a new Company obtained a monopoly in exchange for a loan to Government of £2,000,000. In 1702, the old and new Companies amalgamated and formed the "United Company of Merchants of England trading to the East Indies." In 1784, a Board of Control was erected to regulate the civil and military government of the Company's territories The commercial character of the Company was abolished in 1833; and in 1858, the Government of India was finally transferred from the Company to the Crown.

287. *Startling military exploits.*—In allusion to the many remarkable campaigns and battles that mark the history of the British occupation of India.

,, *An occurrence.*—The famine of 1769.

,, *Mill.*—James Mill, born 1773; died 1836. He was the author of a "History of British India," which was completed in the year 1818. The knowledge and ability shown in this work led to his being employed as head of the Correspondence Department of the East India Company.

,, *The recent Famine Commissioners.*—The men recently appointed by the Government to enquire into the causes of the famines that have, within the last few years, afflicted the North West Provinces, Southern India and Bengal. The last famine was that of 1875.

,, *This distance.*—This distance of time.

,, *Faint speck in the horizon of our rule.*—This is said in allusion to the fact, that that famine happened such a long time ago, that we have no distinct or detailed information respecting it; just as an object is very imperfectly discerned and appears very small when it has left our immediate neighbourhood, and appears only like a dim point in the distant horizon. (Metaphor.)

Page.

287. *Horizon.*—The line at which, to the eye, the sky and earth seem to meet.

„ *In the contemporary records* —In the records of the time when the famine actually occurred.

„ *The key to the history* —The principal fact by means of which the history of Bengal is to be understood.

„ *Places in a new light-* -Explains in a new way.

288. *Broad tracks of desolation* —(Those vast portions of land that we see in this country lying waste. Uninhabited and uncultivated.

„ *The Lower Valley* —The valley of the Ganges, *i. e.,* lower Bengal,

„ *Unfolds the sufferings.*—Explains what the sufferings were.

„ *Immemorial.*—Time out of memory. So old, that the time when they began cannot be remembered.

„ *Forms and usages*—Habits, modes of cultivation, manner of living. practices, &c.

„ *Disorganized and fragmentary* –Disarranged and broken The people were thoroughly disturbed in their old modes of life

„ *Evolved* —Brought out.

., *Had ruled.*— Ha l prevailed.

„ *Affect the Government rental.*— Diminish the amount of revenue that the Government derived.

„ *Local officers.*—Officers in the different districts who wrote representing the condition of their several districts.

„ *Head-quarters*—The seat of government.

„ *The Delta.*—That part of the country through which the Ganges discharged itself by many mouths into the sea The shape is like that of the Greek letter ▲ *delta ;* hence the name.

.. *The whole south-east of Bengal* —The people throughout the south-east portion of Bengal.

Page.
288. *The Bengal Council.*—The Council attached to the Government of Bengal.

  ,,   *To Madras.*—To send grain to Madras when the people were in want.

  ,,   *On a large scale.*—In large quantities.

  ,,   *Calamitous prediction*—Foretellings of a calamity approaching.

  ,,   *Officials.*—(Parse as a noun.) People holding office under the Government.

  ,,   *Mr. Verelst.*—He succeeded Lord Clive in the government of Bengal in the year 1767.

  ,,   *In Council.*—In the Bengal Council.

  ,,   *The province.*—Bengal.

289. *Believed the question to be chiefly one of revenue.*—Believed that the distress was such as to make it necessary to remit some part of the revenue ; but they had no idea that in fact it was depopulating the country.

  ,,   *Policy towards.*—Treatment of.

  ,,   *Had disabled from paying.*—Had rendered unable to pay.

  ,,   *Temporary remissions*—Of rent. That is to say, in times of deficient harvest, the people were allowed to pay something less than the proper amount of tax, with the understanding that they should make up the difference afterwards.

  ,,   *Advances*—Of money, to the cultivators, to enable them to purchase seed for the next crop.

  ,,   *Isolated instances.*—Solitary instances here and there.

  ,,   *Relief-measures.*—(Parse "relief" as an adjective.) Measures adopted with a view to give relief.

  ,,   *In the letters home.*—In the letters written to England. (Parse "home" as in the objective case governed by "to" understood.)

  ,,   *On a sadly inadequate scale.*—Not enough to relieve the distress.

18

Page.
289. *Mussulman Minister of Finance.*—A Kazi.

,, ,, *But the distress, &c.*—But the distress became greater than the Government officers in the district thought that it would become.

,, *Pathetic.*—Touching.

,, *Plentiful.*—Fruitful

,, *Purneah.*—A district of Western Bengal.

,, *To appreciate.*—(Literally, to attach a proper price to.) To form a proper idea of.

,, *The local administration, &c.*—The imperial firman of 1765 conferred on the Company, the Dewanny of Bengal, Behar and Orissa ; but Clive committed the mistake of establishing a double system of government, by which, although the real power was in the hands of the English, the administration was nominally vested in the Nawab, in whose name the revenue was collected, and justice administered by native officers. Marshman, in his History of India, says, on this subject :—" The double government established by Clive, after the acquisition of the Dewanny, though regarded at first as a master-piece of policy, soon proved to be the curse of Bengal. It combined all the vices of a native government, with all the confusion and mischief inseparable from foreign interference. The management of the revenue, which included the entire administration, was in the hands of native agents, who were subject to the supervision of the British resident at Moorshedabad, but his control was merely nominal. There was no European functionary in Bengal conversant with revenue details, and the zemindars were at liberty to make their own terms with the ryots on the one hand, and with the treasury on the other ; in every case it was the interests of the State which suffered."

290. *Its capabilities.*—What extent of crop the country was able to yield.

Page.
290. *Every consultation.*—The record of what transpired every time the Council met to consider the state of the country.

   ,,   *Apprehension* —Fears.

   ,,   *Highly coloured.*—Exaggerated.

   ,,   *The question.*—The matter to be considered.

   ,,   *This misconception* —This mistake in supposing that the difficulty had reference merely to realizing the revenue instead of taking means to prevent the depopulation of the country.

   ,,   *Reticent.*—Not communicative.

   ,,   *Self-contained.*—Keeping their thoughts, wants, and all matters that concern themselves to themselves.

   ,,   *Distrustful of foreign observation.*—Suspicious when they find a foreign nation observing them.

   ,,   *Taciturnity.*—Silence.

   ,,   *Ruffle.*—Disturb.

   ,,   *The emotional part of his nature.*—The emotions of love, hate, hope, fear, &c.

   ,,   *Is in strict subjection* —Is not suffered to display itself.

   ,,   *Resentment.*—Anger.

   ,,   *Passion* —Strong love.

   ,,   *Reaches its climax.*—Becomes strongest (Gr *klimax*, a scale or ladder; indicating ascent step by step.

   ,,   *Is a mystery.*—Is concealed. (The reference is to the inner or women's apartments, occupied by the family.

   ,,   *European courtesy.*—Courtesy as practised among Europeans

   ,,   *Stifling.*—Intensely hot.

   ,,   *Seed-grain.*—The grain that is kept for the purpose of being sown.

291. *The Durbar.*—The court of the Nawab at Moorshedabad.

Page.

291. *A torrent.*—(A stream that runs down with great
   violence. Metaphor) Vast numbers of people
   eagerly hastening to the great cities.

,, *Pestilence.*—An epidemic and mortal disease.

,, *Glided through, &c.*—Passed on from one mute to
   another.

,, *Viceregal.*—The Nawab was the viceroy or repre-
   sentative in Bengal of the Emperor of Delhi.

,, *Mutes.*—Men employed in royal palaces in oriental
   countries, who are dumb. (L. *mutus*, silent.)

,, *Interment could not, &c.*—The dead bodies could not
   be buried fast enough.

,, *Scavengers.*—Persons employed to clear the streets
   of a city.

,, *Revolting.*—Disgusting ; that at which the mind
   revolts.

,, *Mangled.*—Distorted.

,, *Festering.*—Corrupting, rotting.

,, *John Shore.*—Sir John Shore became Governor-Gen-
   eral in 1793 (For an account of his career in this
   country see the History of India)

,, *An eventful career.*—A career full of important
   events.

,, *Sensitiveness.*—Quickness to detect.

,, *Premonitory*--Warning beforehand.

,, *Elaborated.*—Worked out or prepared in all its detail.

,, *His most historical act.*—The act by which he will
   be most remembered in history.

,, *Of eastern service.*—Of the time of his service in
   India.

,, *Non-official description.*—Description by a person
   who was not an officer of the Government.

,, *Metrical.*—Recorded in metre (measure) or verse.

,, *John Shore's poetry, &c.*—This is said in allusion to
   the fact that in poetry a man's imagination often

Page.

tempts him to say things that are a little beyond the actual truth, a thing which he would not do if he were describing the same thing in prose.

291. *Memory's eye.*—(Personification.) The eye of memory.

" *Fell.*—Ravenous.

" *Unmolested.*—(Participial adjective qualifying "they," *i e.,* the jackal, the vulture, and the dog.

" *Their prey.*—The dead bodies.

" *Trace.*—Describe.

" *Memory's page.*—Memory is supposed to have a book in which every thing is recorded. (Personification.)

" *Efface.*—Rub out.

" *Christian humanity* —The humanity or kindness to men taught by the religion of Jesus Christ.

" *The meaning of the words, &c.*—Men have now so far learnt to be helpful to one another in times of pestilence and famine, that the terrible distress that used to accompany these things in ancient times is not suffered to exist now.

292. *The latter term.*—Famine.

" *Regime* —(Pronounce *re-zheem.*) Order or state of things.

" *Coloured.*—Exaggerated.

" *Pages.*—Representation.

" *Strained.*—Stretched ; exaggerated.

" *Gour* —The ancient capital of Bengal, which was depopulated and abandoned about the year 1560. It was situated on the confines of Bengal and Behar, and extended along the banks of the Ganges. It was adorned with splendid buildings, and had a stone embankment along the river extending over fifteen miles. It was a pestilence that helped to depopulate it.

" *Appalling spectre.*—Fearful ghost.

" *Threshold.*—Outset, beginning.

Page.

292. *The Hindu metropolis.*—(Gr. *mētēr* mother, and *polis* city; the mother city.) Gour.

„ *The historian of Bengal.*—John Clark Marshman, whose "History of Bengal" has for many years been a popular class-book.

„ *Averts* —(L. *a* from and *verto* to turn.) Turn away; avoid.

„ *Endemics* —(Gr. *en* and *demos* a people.) Diseases that prevail among a people, and• that are attributable to local causes and peculiarities of season. (Distinguish between an endemic and an epidemic. The latter is a disease which does not arise from local causes and is not confined to particular seasons or climates.)

„ *Court of Directors.*—A body of men who had the direction of the affairs of the East India Company.

„ *Had swooped down upon it* —(Metaphor). The figure is taken from the action of a large bird when it descends suddenly down from the air to seize on some prey. So famine is represented as a *bird of prey* descending suddenly upon the people of Bengal.

„ *The scenes of.*—The events that had happened during.

„ *Phantasmagoria.*—The pictures of a magic lantern.

293. *Christmas eve.*—The day before Christmas day (24th December.)

„ *Generous.*—Large, abundant.

„ *Military stores.*—Stores of food for the troops.

„ *Apprehension for.*—Fear on account of.

„ *Increase.*—Fruits and food, produce of the earth.

„ *Less favoured provinces.*—Provinces where there had not been such a good harvest.

„ *Intensified.*—Made intense or severe.

„ *High prices had ruled.*—High prices had prevailed. ("Ruled" in this connection is used as an intran-

sitive verb: but in really it is even here a transitive verb, having for its object "market" understood.)

293. *Deficiency.*—(Parse, as in the nominative case, in apposition to "nothing," and coming after the verb "had been."

,, *Materially.*—To any great extent.

,, *Nature.*—The natural fertility of the soil.

,, *She.*—Nature.

,, *Attest.*—Prove.

,, *A silent and deserted province.*—A province that had lost its population.

,, *Officially.*—By the officers of the Government.

,, *The deaths were returned*—The reports or numerical statements that were made (returned) as to the number of deaths, showed that the proportion was.

,, *Packet after packet.*—(A "packet" is a ship engaged to convey packages, letters, &c., from one country to another.) Ship after ship went to England from India carrying letters containing details of the famine.

" *Indeed, whatever may be, &c.*—(Mark in this sentence, the sudden transition from the past to the present tense. The inference is, that the writer at the time when he was writing had the letter, he is speaking of, before him.)

,, *Whatever may be the subject of a communication to begin with.*—Whatever may have been the subject contained in the first part of a letter such at this time from Bengal. (The words "subject to begin with" must be parsed together as the predicate of the verb "may be."

,, *Communication.*—Letter.

,, *It seems*—"It" has for its antecedent "communication."

Page.
293 *To slide.*—To pass easily, and almost unconsciously into.

,, *The great topic of the day.*—The famine.

,, *The day.*—The time.

,, *Adverting.*—(L. *ad* to and *verto* to turn.) Referring to.

,, *Mortality*—(This word is used in more than one sense. Sometimes it means liability to death; sometimes it denotes death itself; and sometimes, as in the text, it denotes the death of great numbers.

294. *Desertion.*—The leaving of their homes in search of food.

,, *Ryots.*—Cultivators of the soil; tenants of land.

,, *The revenue farmers.*—The men who took a farm of the revenue collections. They were a sort of middlemen to whom the Government farmed or leased out the collection of the revenue.

,, *To fall out of tillage.*—To have lands left uncultivated.

,, *The Commissioners.*—(L. *com* with and *mitto* to send. Men sent to do a certain work.) Men appointed to ascertain from enquiry what the extent was of the desolation that had been caused by the famine.

,, *Dearth.*—(Noun, from the adjective "dear," which means rare, scarce.) Scarcity.

,, *Warren Hastings.*—The second Governor of Bengal, who assumed office in 1772. (For particulars of his career, see the History of India.)

,, *A progress.*—A journey. (The word is generally applied to a journey of state, such as the Governor of a province would make through his jurisdiction, or a King would make through his dominions.

,, *Aggregate.*—(L. *ad* to and *grex* a herd or flock. A gathering to.) Total amount.

Page.

294. *Historic times.*—Times of which we have authentic history. (Prehistoric times are the times *(pre)* before any history was written, and of which, therefore, we have only traditions)

WHEELER.

For some years Assistant Secretary in the Foreign Department of the Government of India, and the author of the translations from the Mahabharata and Ramayana, and of "Early Records of British India," "A History of India from the earliest Ages," "The Geography of Herodotus," &c.

THE RAJASUYA OF YUDHISHTHIRA.

294. *Rajasuya.*—A royal sacrifice made by a king in the presence of his tributary princes.

  ,,   *Yudhishthira.*—One of the heroes of the *Mahabharat,* the great epic poem of India. He was the eldest of the Pandavas. His determination to celebrate the sacrifice of the horse excited the jealousy of the Kauravas, the other branch of the lunar line, and, having been tempted into play by the chief of the Kauravas, he staked and lost his wife and his kingdom, and was forced to go into exile for twelve years. On the expiration of this time, he demanded back his kingdom Hustinapore. This was denied him, and the great battle of Kuru-kshetra was fought, which is said to have lasted eighteen days. Victory declared itself for Yudhishthir, but when he beheld the battle-field piled up with the slain, he resolved to retire from the world. The war of the Mahabharat is supposed to have taken place in the 12th century B. C.

  ,,   *Pandavas.*—One of the two branches of the lunar race. Cousins of the Kauravas.

  ,,   *Duryodhana.*—The chief of the Kauravas.

  ,,   *The Maharaja.*—Yudhishthir.

  ,,   *Bhishma.*—The grandfather of the Pandavas.

  ,   *Drona.*—A priest.

Page.

294. *Drupada.*—A neighbouring king.

" *Droupadi.*—The common wife of the Pandava bro
thers.

" *Sisupala.*—A Hindu king who was slain by Krishna

" *Krishna*—A scion of the royal family of Muttra, on
the Ganges, and the founder of a kingdom at
Dwarka in Guzerat. He is the hero of the Maha-
bharat, and was deified after his death.

" *Balarama.*—The founder of a kingdom of which
Pahbothra was the capital.

295. *The Brahmans*—The priestly class among the Hin-
dus.

" *The Kshatriyas.*—The warrior class.

" *The Vaisyas*—The mercantile class.

" *The Sudras.*—The servile class.

" *Indraprastha.*—The ancient name of the city of Del-
hi.

" *Vedic hymns.*—Hymns taken from the *Vedas*, one
of the sacred books of the Hindus and a compila-
tion of hymns, prayers and precepts.

" *Vyasa.*—An ancient sage, supposed to have been the
compiler of the " Vedas" and " Puranas," and the
founder of the Vedanta school of Philosophy."

The City of Ayodhya.

296. *Ayodhya.*—This was the ancient Capital of Rama,
and the people of the solar race. The place is
the same as the Ajudhya near Fyzabad in the
province of Oudh. Oudh is the same word as
Ayodhya.

" *The Ramayana.*—An epic poem celebrating the ex-
ploits of Rama, king of Ayodhya, who was after-
wards deified by the Hindus.

" *Site.*—Situation, place, spot.

" *The Indian peninsula.*—Hindostan, which is a penin-
sula.

Page

296. *Is highly significant of.*—Is a strong proof or indi-
cation of.

"   *Aryan invasion.*—The Aryans or Indo-Europeans,
who settled in the Punjab before times of which
we have any historical record, gradually pushed
their conquests southward and eastward into Hin-
dostan   They probably took many centuries to
do this ; but they ultimately succeeded, and drove
the non-Aryan inhabitants into the mountains
and forests. (The Aryans were originally one
tribe, occupying Central Asia.   When they se-
parated themselves, some went to form the na-
tions of Europe and others overran Hindostan.)

"   *Ramayana.*—The second and later epic poem of the
Hindus, celebrating the exploits of Rama.

"   *The Gogra.*—A river in Oudh.

"   *Bhils* —A wild race inhabiting the mountains and
forests of Malwa, Mewar and Kandesh, and in the
Deccan to the north of Poona   In former times
they were notorious for their depredation.

"   *Almost a Blank.*—Almost nothing, that is, there is
scarcely any record of the early history.

"   *Rishi.*—An inspired sage. (The Rishis abound in
Hindu mythology.

297. *Brahma.* —The creating god.

"   *The national epic* —The Ramayana (called "national"
because it belongs to the Hindus as a nation.)

"   *The peculiar deity.*—Brahma.

"   *Authentic.*—Reliable, true.

,   *Brahmanical exaggerations* —Exaggerated descrip-
tions so commonly practised by Brahmans.

"   *Profuse.*—Excessive.

"   *Bard.*—Poet.

"   *Domes.*—Rounded roofs.

"   *Resplendent* —Shining ; gaudy.

297. *The white lotus* —The water-lily. (An aquatic plant, *i. e.*, a plant that grows in (*aqua*) water.)

" *Drove the white lotuses from the bees* —The wind blowing upon the flowers and making them rock on their slender stems made it difficult for the bees to settle down upon them.

" *Coy.*—Modest, shy.

,, *Brilliant.*—Bright-colored.

" *Reflection* —Shadow.

,, *Like reverential pupils.*—(Figure simile)

,, *Preceptors* —Teachers

,, *Amaravati* —The city of the gods.

,, *Indra.*—The god presiding over the Hindu heaven.

" *Twanging* —(Onomatopœia.) The word to "twang" is taken from the sound made by the bow-string when it is drawn and then suddenly released.

,, *Vedic hymns.*—Hymns taken from the Vedas.

298. *Moat.*—Ditch.

" *The eight-points of the universe.*—The north, northeast, east, south-east, south, south-west, west, north-west.

" *The best of rice.*—The best (kind) of rice. (The phrase is elliptical)

,, *The sacrificial fire.*—The fire on the altar on which animals slain for sacrifice were consumed.

" *Vedanga.*—The six auxiliary branches of sacred science, viz.. *siksha*, or rules of pronunciation ; *kalpa*, or religious ceremonies ; *vyakaran*, or grammar ; *chhandas* or prosody; *jyatish*, or astronomy; and *nirukti*, or the interpretation of the obsolete words occurring in the Vedas.

" *Arrogant.*—Insultingly proud.

" *Malevolent.*—(L. *malus* bad, and *volo* to wish.) Wishing evil to others.

Page.

298. *Tarnished ornaments.*—Ornaments that had lost their lustre.

299. **Chandalas.**—The most degraded class of Hindu society; outcasts.

  ,,   *Beasts.*—Misprint for " beast."

  ,,   *Mohobat.*—This word ought to be *nahabat,* the name given to a temporary erection over a gateway for the accommodation of musicians on a festive occasion.

  ,,   *Quarter.*—Fourth part; that is, every *prohar,* each *prohar* being equal to three hours.

  ,,   *The three worlds.*—Heaven, earth and the infernal regions.

  ,,   *Manu.*—The name of the legislator of the Hindus, the son of Brahma. According to the Hindus, there are fourteen successive Manus presiding over the universe. This is the reference in the text.

300. *To return it.*—To return the water of the ocean.

  ,,   *Purifying.*—Life-giving.

  ,,   *Ideal.*—Perfect conception.

  ,,   *A poetical sympathy with external nature.*—A mind ready to take in the spiritual thoughts suggested by natural objects, such as scenery, &c.

  ,,   *Dreamy.*—Imaginative ; fond of contemplating unreal things.

  ,,   *Doubly curious.*—Curious for two reasons ; one, the dreaminess of character, and the other, the submission to Brahmanical ideas, which are full of ritual and ceremony.

  ,,   *Brahmacharis.*—These were priests ; the servants of Brahma.

301. *Calling.*—(That to which a person is called.) Occupation.

  ,,   *Which furnishes a glimpse of the reality.*—Which gives us some idea of what the real state of things was.

THE CHILDHOOD OF RAMA.

301. *Aswamedha.*—(Sanskrit *aswa* a horse, and *medha* a sacrifice.) The sacrifice of the horse. This was a royal sacrifice. Lethbridge, in his History of India, thus describes it :—"A horse was taken of a black colour or else 'pure white like the moon, with a yellow tail and a black right ear,' and was allowed by the Raja to run loose, with certain public ceremonies. From that day and for a whole year, the horse war followed in its wandering by the Raja and his army. This was a direct challenge to every Raja into whose territories the horse might wander. If the Raja succeeded in conquering all the Rajas who resisted him, or who tried to take away the horse, he returned in triumph at the end of the year to his own city, attended by all the subdued chieftains; and the Aswamedha was brought to a close by the sacrifice of the horse and a grand banquet in which the flesh of the horse was eaten by the Raja and the most distinguished guests."

A helpless infant —(In apposition to "he.') He lay as a helpless infant.

On two grounds.—For two reasons.

302. *Downright.*—Thorough.

Realism.—Fidelity to what really took place.

Mould.—That into which any thing is cast that it might receive its form.

Men of sterner mould.—Men whose minds have been cast in a sterner mould; that is to say, men of sterner or harder minds.

No parallel.—Nothing corresponding to it.

Which drew so much reverence.—In allusion to the mode in which homage was paid to the infant, the foot being touched as mark of reverence by those who came to see him.

Vasishtha.—A celebrated ancient rishi or sage.

Page.

302. *Vishnu*—One of the members of the Hindu triad. He was the preserver, Bramha was the creator, and Maheswara or Thiba was the destroyer.

" *The Bimba fruit.*—A fruit of brilliant red colour, belong to the same tribe as the melon or pumpkin.

" *The chakra.*—(A circle.) The allusion is to palmistry, which professes to teach how the marks on the palm of the hand may be understood to predict the career of the owner of the hand.

" *Perchance.*—Perhaps.

" *Lullaby*—(*Lull* to quiet, and *by* a word, used in quieting infants into sleep.) A song to quiet babes.

304. *Susti.*—A Hindu goddess to whom sacrifices are generally offered on the birth of a child.

" *Propitiated*—Appeased

" *Mantra.*—An incantation.

" *Unpacified.*—Not quieted

" *Sumantra.*—(*Su* good, and *mantra* advice.) The maharaja's counsellor

" *Sandal.*—Wooden shoes.

" *Sumaru*—A Himalayan peak.

" *Piercing the ears.*—This ceremony is known among Hindus as *karnabedh.*

" *Initiated them in.*—(L. *initium* a beginning.) Made them begin.

" *Reeds.*—Reed-pens

" *Preceptor.*—Teacher.

" *Bring the truant in.*—Parse "in" as an adverb qualifying the verb "bring."

" *Truant.*—A boy who idles about instead of being at school.

306. *Hide-and-seek.*—A game in which a boy is chosen in turn to seek the other boys, who have hidden themselves.

Page.
306. *Mock.*—(Adjective) To mock is to imitate. A mock-fight is an imitation fight, a play-fight.

,, *The umbrella.*—One of the insignia of Hindu kings.

,, *Chamara.*—A fan or fly-brush.

,, *Invested with the sacred thread.*—The sacred thread is the Brahmanical thread. The ceremony of investiture is called the *upanayan.*

,, *Gayatri.*—A hymn to the Sun contained in the Sanhita of the Rig-Veda and considered particularly holy.

,, *The ordinance.*—The ceremony of investiture.

,, *Carried his bag, &c.*—In allusion to a practice associated with the *upanayan.*

,, *Dole.*—(From the same root as the verb to *deal,* meaning to distribute.) Contribution.

307. *Mithila.*—A city supposed to have been on the north-east of Bengal.

,, *Western babies.*—Babies of western lands.

,, *Fractious.*—Fretful.

,, *Primitive.*—Belonging to very early times.

,, *Exorcise*—(Gr. *ex* out of, and *orkos* an oath. To drive out by an oath or certain words of abjuration.) Drive the evil spirit out of him.

,, *Patriarchal life.*—Life in the old times, when the only law was that of the chief (*archos*) of the family (*patria*).

PALGRAVE.

W. G. PALGRAVE, a son of Sir Francis Palgrave and the author of a remarkable book of "Travels in Central and Eastern Arabia.'

308. *Augury.*—(L. *avis* a bird. Prediction supposed to be based on the flight or singing of birds.) Sign.

,, *Of etiquette.*—Required by etiquette, or the rules of polite society.

Page.
309. *An apologetical salutation.*—A greeting that is
intended to appear like an apology for taking the
honoured post.

„ *Weight.*—The weight of his body.

„ *Sandal.*—A kind of shoe which consists, however,
merely of a sole secured to the foot by means of a
strap over the instep.

„ *Bedouin.*—The Bedouins are a tribe of wandering
Arabs whose home is in the desert.

„ *Gentle or simple.*—Refined or uncultivated.

„ *During the pauses of conversation.*—During the
intervals in which nothing is being spoken.

„ *These open.*—These preparations begin.

„ *Other operations are in progress.*—Other things are
being done in the way of getting the coffee ready.

„ *Trencher.*—A plate. It is the same as the soup-plate
common in this country.

„ *Non-homologous.*—Not the same kind. (Things that
had got mixed up with the coffee berries, but
which were not coffee.

„ *In gross.*—In large quantities.

„ *After the erroneous fashion.*—According to the mis-
taken practice.

„ *Aperture.*—Opening.

310. *Now reduced.*—That is, after having been pounded,
the berries have become like, &c.

„ *Crit.*—Meal or any similar substance when it has
been only coarsely ground.

„ *Aroma.*—Smell.

„ *Ground.*—(Past participle of the verb "to grind.")

„ *Nicety.*—Exactness.

„ *Ebullition.*—Boiling over.

„ *Interim.*—Meantime.

„ *Simmering.*—Boiling gently.

Page.

310. *Profanation.*—An improper admixture would be almost regarded as amounting to a sin. (L. *pro* and *janum* a temple. Any thing that violates the sanctity of a temple.)

,, *The inner palm bark.*—(Parse "palm bark" as one word and "inner" as an adjective qualifying it.) What is meant, is not the inner palm, but the inner bark of the palm. ("Inner" is properly the comparative degree of "in.")

,, *Parti-coloured*—Having different colours.

., *Preliminaries.*—(L. *præ* before, and *limen* a threshold.) Things needing to be done preparatory to the main thing. (Parse as a noun in the plural number.)

., *The upper places.*—The part of the room covered by the carpet, called "upper" because of its respectability.

,, *Townsfolk.*—People who live in towns as compared with the Bedouins who inhabit the desert, and are nomadic in their habits.

.. *Squatted down.*—Sat down on the floor, or ground, not on any chair or other elevated seat.

,, *Importance*—Social position; rank.

, *To receive us.*—To welcome us as guests and entertain us.

., *The entrance pass.*—(Parse "pass" as a noun.) A pass is a passage between two mountains or ranges of the hills. The entrance to the town was through such a pass.

,, *Betokens.*—Is a token or sign of. (When prefix "be," which is the same as by, is added to a noun, the result is a transitive verb; as betaken, bedew, bemoan.)

,, *Clad.*—Passive participle of the verb "to clothe."

,, *Syria and Damascus.*—Syria the land, and Damascus the town.

Page.

310. *Syria.*—A considerable division of Turkey in Asia, washed on its western coasts by the Levant, and including Palestine and the desert (known as the Syrian desert) occupied by the Bedouin Arabs.

„ *Damascus.*—The chief town of Syria, and the oldest city in the world.

„ *Conformably to.*—Agreeably to, or in accordance with.

„ ‘ *The disguise already adopted.*—The author here refers to the costume of a native of Damascus which he had assumed. Owing to this costume (disguise) he was taken for a Damascene, and he was questioned as if he was a native of Damascus.

„ *That patients and purchasers are likely to abound.*— We are likely to have many sick people applying to us for medicines and many wanting to buy the things we had for sale.

311. *The Djowf.*—A settlement in the Arabian desert.

„ *Next door to it.*—Almost mad.

„ *To rush into the vast desert around.*—Mark the force of the word "around." Would it not have been enough to have said, "rush into the vast desert"? No! because, when the author adds "around," his words imply not merely rushing into the desert, but rushing so far into it as to have the desert all around you; that is to say, to rush into the very heart of the desert where the Djowf is.

„ *We had small danger of competition.*—We were not in much danger of having other people being there wanting to sell their medicines and wares so as to compete with us.

„ *Blacky.*—Soweylims the servant, so called on account of his dark complexion.

„ *Charged with.*—Burdened with carrying.

„ *The heap.*—The heap of dates.

„ *Set to work at it.*—Begin eating.

„ *Coyness.*—Shyness.

311. *Join the circle.*—Join those who are seated around the dish.

  ,, *Half-amalgamated mass.*—The mass of dates which were stuck together so closely as almost to become one solid lump. (Amalgamate comes from the Greek verb *malasso* to soften.)

  ,, *When.*—At which time; *i. e.*, when he has had enough.

  ,, *Begins his round.*—(Parse "round" as a noun in the objective case governed by "begins.") Begins to go round to the guests, offering them coffee.

  ,, *Tray.*—An open flat surface, like a large plate, sufficiently large to admit of several cups being arranged upon it.

  ,, *Pouring out.*—Of coffee, from the coffee pot.

  ,, *In etiquette.*--In obedience to the rules of etiquette, *i.e.*, of social practice.

  ,, *A practical assurance.*—If he had merely by word of mouth assured the guests that the coffee was not poisoned, it would have been only a *verbal* assurance; when he drank some himself, it was a a *practical* assurance, that is, an assurance given by an act of his.

  ,, *That there is no " death in the pot."*—That there is no poison put into the coffee-pot, which might cause the death of any one drinking the coffee. ("Death in the pot" is a quotation from the Bible—See II Kings IV; 38-41, where the following incident is related : "And Elisha (who was a Hebrew prophet) came again to Gilgal : and there was a dearth in the land ; and the sons of the prophets (that is, those who came for instruction to Elisha,) were sitting before him : and he said unto his servant, set on the great pot (*i.e.*, set it on the fire,) and seethe (cook) pottage (a vegetable soup) for the sons of the prophets. And one went out into the field to gather herbs, and found a wild vine, and gathered thereof wild

goards (some of the fruit) his lap full and came and shred (threw) them into the pot of pottage, for they knew them not. So they poured out for the men to eat. And it came to pass, as they were eating of the pottage, that they cried out and said, O thou man of God, there is death in the pot. And they could not eat thereof. But he said; Then bring meal. And he cast it into the pot; and he said, Pour out for the people, that they may eat. And there was no harm in the pot "

311. *Those next the honourable fire side.*—Nearest to the honoured or special guests who had the best place, *i. e.*, at the fire-side.

,, *This is consolted.*—By ' this '' is meant having only a half-filled cup

,, *A brimmer.*—A cup filled to the brim.

,, *Here.*—Among the Arabs.

,, *Cup-stands.*—Stands on which to place cups

,, *Without medium.*—Without something between the hot cup and the fingers holding it.

,, *The peninsula.*—Arabia

,, *Beverage.*—The drink : the coffee

,, *Aromatic.*—(Gr. *aroma* a smell.) Strong scented.

,, *Tonic.*—Any thing that gives tone, that is vigour, to the body.

,, *Levantine.*—The people occupying the coast of the Levant, the eastern end of the Mediterranean.

,, *Roast-bean preparation.*—In allusion to the chicory, a bean that is extensively used in France to adulterate coffee.

312. *A second round is poured out.*—The cups have coffee poured into them a second time in order to be taken round to the guests.

A first reception.—(" Reception " is in apposition to " occasions " At a first reception.) The occasion of a guest being entertained for the first time.

Page.
312. *The ruddy liquor.*—("Ruddy" means red.) The coffee.

,, *Imbibes.*—(L. *in* into, and *bibo* to drink.) Drinks down.

,, *Draught.*—Quantity drunk at a time.

,, *Set up, &c.*—Establish a shop and administer medicines.

., *Domestic stock.*—The supply he had for consumption at home.

., *Under cover of.*—On the pretext or excuse of

,, *Drive an advantageous bargain.*—Buy our coffee cheap.

, *Prying.*—Looking with curiosity.

,, *The independent position.*—Circumstances in which we should be free to do as we please.

, *Proffer.*—The offer he made of his house to be used as a shop.

., *Installed.*—Placed in.

, *Centre.*—In the centre of the town, so that people from all parts of the town could easily come to us

,, *Repose.*—Rest

THE END.

THE

INDIAN STUDENT'S COMPANION

TO

ALGEBRA.

BEING A COLLECTION OF THE ENTRANCE AND MATRICULATION
EXAMINATION PAPERS IN ALGEBRA OF THE INDIAN
UNIVERSITIES, AS WELL AS THOSE OF THE UNIVERSITIES
OF LONDON, OXFORD AND CAMBRIDGE.

WITH ANSWERS.

BY

A B H A Y   C H A R A N   P A U L, B. A., B. L.

———

Page	7	Line 19	for	$\frac{1}{2}x + \frac{1}{2}y$	read	$\frac{1}{2}x + \frac{1}{4}y$.
,,	9	,, 21	,,	$9c^2$	,,	$19c^2$.
,,	16	,, 16	,,	x^{2n}	,,	x^{2n}.
,,	20	,, 20	,,	Terah	,,	Reu.
,,	,,	,, ,,	,,	supply before who—" Nahor when he had lived 29 years begat Terah."		
,,	41	,, 11	,,	$2a^{\frac{3}{2}}c^{\frac{2}{3}}$	,,	$2a^{\frac{3}{2}}c^{\frac{3}{2}}$.
,,	47	,, 2	,,	$a^{\frac{1}{2}}$	,,	$a^{\frac{3}{2}}$.
,,	51	,, 4	,,	$4x^5y^2$	,,	$4x^4y^2$.
,,	86	,, 18	,,	$x^2 + 3x^3$	,,	$x^2 + 3x + 5x^3$.
,,	91	,, 17	,,	$(a+a)$	,,	$(a+b)$.
,,	96	,, 15	,,	$(1-c^2)+(a+bc)$	,,	$(1-c^2)-(a+bc)$.
,,	104	,, 1	,,	$a^{-\frac{1}{b}}+b^{\frac{1}{b}}$	,,	$a^{\frac{1}{b}}+b^{-\frac{1}{b}}$.
	108	,, 6	,,	$x^2 - \sqrt{3xy} + y^2$	,,	$x - \sqrt{3xy} + y$.
,,	,,	,, 7	,,	$2(ad-bc)^2$	,,	$2(ad-bc)$.
,,	,,	,, 8	,,	$(a-b)y+(a-b)x$	,,	$(a-b)y-(a-b)x$.

ENTRANCE EXAMINATION PAPERS.

ALGEBRA.

I—(1858.)

1. Explain the rule for the signs in algebraical multiplication, and multiply

$$7x^{\frac{1}{3}}-3y^{\frac{1}{3}}+2x^{\frac{2}{3}}y^{\frac{2}{3}} \text{ by } 6x^{\frac{1}{3}}-2y^{\frac{2}{3}}+7x^{\frac{2}{3}}y^{\frac{1}{3}}.$$

2. Find a fraction such that if 1 be subtracted from its numerator, the value shall be $\frac{3}{4}$, and if 6 be added to the denominator the value shall be $\frac{1}{2}$.

3. A and B can do a piece of work in 30 days, A and C in 40 days, and B and C in 50 days. All three work together for 10 days. If then two be taken away, how long will each of the others take to finish it?

II—(1859.)

1. Shew that

$$\left\{ (ax+by)^2 +(ay-bx)^2 \right\} \times \left\{ (ax+by)^2 -(ay+bx)^2 \right\}$$

$$(a^4-b^4)(x^4-y^4).$$

2. Divide $x^6+2x^3y^3+y^6$ by $(x+y)^2$.

3. Resolve $x^{12}-a^{12}$ into its simplest factors, and simplify

$$\frac{1+\dfrac{a-b}{a+b}}{1-\dfrac{a-b}{a+b}} + \frac{1+\dfrac{a^2-b^2}{a^2+b^2}}{1-\dfrac{a^2-b^2}{a^2+b^2}}.$$

4   Find the greatest common measure of $x^3 + 3x^2 - 9x + 5$
     and $x^3 - 19x + 30$.

5.   Solve the equations —

   (i) $\frac{1}{2}\left(x - \frac{a}{3}\right) - \frac{1}{36}\left(x - \frac{1}{4}\right) + \frac{1}{5}\left(x - \frac{a}{5}\right) = 0.$

   (ii) $\frac{a}{c-a} - \frac{b}{c-b} = \frac{a-b}{x-c}.$

III—(1860.)

1   Add together $\frac{1}{x+3} + \frac{x+1}{x^2-3x+9} - \frac{x^2+x+12}{x^3+27}$

2   Divide $x^{\frac{4}{3}} + x^{\frac{2}{3}}y^{\frac{1}{3}} + y$ by $x^{\frac{2}{3}} - x^{\frac{1}{3}}y^{\frac{1}{3}} + y^{\frac{2}{3}}$, and simpli-

   fy the expressions $\frac{a+c}{(x-a)(b-a)} + \frac{b+c}{(x-b)(a-b)}$

   and $\frac{a^4-b^4}{a^2-2ab+b^2} \times \frac{a-b}{a(a+b)}.$

3.   Solve the following equations:—

   $$\frac{1}{x-1} + \frac{1}{x-4} = \frac{2}{x-3} \quad \dots \quad \dots (1).$$

   $$\frac{2x+11}{x+5} - \frac{9x-9}{3x-4} = \frac{4x+13}{x+3} - \frac{15x-47}{3x-10} \dots (2).$$

4   A person bought a picture at a certain price and paid the
     same price for the frame; had the frame cost £1 less and
     the picture 15s. more, the price of the frame would have
     been only half that of the picture. Find the cost of the
     picture.

IV—(1861.)

1.   Divide $28x^4 + 13x^2y^2 - xy^3 + 15y^4$ by $4x^2 + 4xy + 3y^2$

2.   Reduce $\frac{1}{4a^3(a+x)} + \frac{1}{4a^3(a-x)} + \frac{1}{2a^2(a^2+x^2)}$ to the

   form $\frac{1}{a^4-x^4}.$

3 Multiply $x - x^{\frac{1}{3}}y^{\frac{1}{3}} + y$ by $x^{\frac{1}{3}} + y^{\frac{1}{3}}$.

4 Solve the following equations :—

(1) $6\frac{1}{3} + \dfrac{x-7}{3} - \dfrac{4x-2}{5} = 0.$

(2) $4x + 3 - 8x - 9 = 0.$

(3) $\sqrt{(x+9)} - (1 + \sqrt{x}) = 0.$

(4) $\begin{cases} x + 3y - 10 = 0 \\ 3x + 2y - 9 = 0. \end{cases}$

V—(1862.)

1 Reduce to its simplest form $\dfrac{x+y}{x-y} + \dfrac{x-y}{x+y} + \dfrac{x^2+y^2}{x^2-y^2}.$

2 Square $a^{\frac{1}{3}} - b^{\frac{1}{3}} + c^{\frac{1}{3}}$ and divide 1 by $(a+b)^2$ giving 3 terms of the quotient.

3. Prove that if $a : b :: c : d$, then $a \pm b : a \quad c \pm d : c$.

4. Solve the following equations :—

(a) $2x + 11 = 7x - 14.$

(b) $\sqrt{x+9} = 1 + \sqrt{x}.$

(c) $\dfrac{a-b}{x-c} = \dfrac{a+b}{x+2c}.$

5. What fraction is that which, if 1 be added to the numerator, becomes 1, and if 1 be added to the denominator becomes $\frac{1}{2}$?

VI—(1863.)

1. Prove that $\dfrac{x+y}{y} - \dfrac{x}{x+y} - \dfrac{x^3-x^2y}{x^2y-y^3} = 1.$

2. Divide $a^8 + x^8$ by $a + x.$

Multiply $x^{\frac{1}{4}}y + y^{\frac{2}{3}}$ by $x^{\frac{1}{3}} - y^{\frac{1}{3}}.$

3. Solve the following equations :—

   (a) $\dfrac{2x}{5} + \dfrac{x-2}{3} = 2x-7.$

   (b) $\sqrt{3x} - 4 = \sqrt{3x+4}.$

   (c) $\begin{cases} 2x - \dfrac{y-3}{5} = 4 \\[2mm] 3y + \dfrac{x-2}{3} = 9. \end{cases}$

4. A post is a fourth of its length in the mud, a third of its length in the water, and 10 feet above the water, what is its length ?

VII—(1864.)

1. Add together $x^2 - (x-y+z)\,(x+y-z)$, $y^2-(y-x+z)$ $(y+x-z)$ and $z^2-(z-x+y)\,(z+x-y)$.

2. Multiply $x+y+z-\sqrt{xy}-\sqrt{yz}-\sqrt{xz}$ by $\sqrt{x}+\sqrt{y}+\sqrt{z}$; and divide $x^8+a^4x^4+a^8$ by x^2-ax+a^2.

3. Simplify

$$\tfrac{1}{2}\cdot\frac{1}{x-1} - \frac{x-5}{x^2-7x+10} + \tfrac{1}{2}\cdot\frac{x-6}{x^2-9x+18}.$$

4. Solve the equations :

   (a) $\dfrac{x-1}{3} - \dfrac{x-9}{2} + \dfrac{3x-2(x-2)}{7} = 4\tfrac{1}{4}.$

   (b) $\begin{cases} 5x + 11y = 146 \\ 11x + 5y = 110. \end{cases}$

VIII.—(1865.)

1. Divide the continued product of $1+x+y$, $1+x-y$, $1-x+y$, $x+y-1$ by $1+2xy-x^2-y^2$; and resolve $4\,(uz-xy)^2 - (u^2-x^2-y^2+z^2)^2$ into 4 factors.

2. Find the G. C. M. of $2x^5 - 11x^2 - 9$ and $4x^5 + 11x^4 + 81$

and reduce $\dfrac{x^3 - 6x^2 - 37x + 210}{x^3 + 4x^2 - 47x - 210}$ to its lowest terms.

3. Simplify as much as possible any one of the following --

(1) $\dfrac{x^2}{(x-y)(x-z)} + \dfrac{y^2}{(y-x)(y-z)} + \dfrac{z^2}{(z-x)(z-y)}$.

(2) $\dfrac{1}{x(x-y)(x-z)} + \dfrac{1}{y(y-z)(y-x)} + \dfrac{1}{z(z-x)(z-y)}$.

(3) $\dfrac{x^2-yz}{(x-y)(x-z)} + \dfrac{y^2+xz}{(y+z)(y-x)} + \dfrac{z^2+xy}{(z-x)(z+y)}$.

4. Find the value of

$$\frac{x+2a}{x-2a} + \frac{x+2b}{x-2b}, \quad \text{when} \quad x = \frac{4ab}{a+b}.$$

5. Solve any two of the following equations :—

(1) $\dfrac{x-a}{b} + \dfrac{x-b}{c} + \dfrac{x-c}{a} = \dfrac{x - (a+b+c)}{abc}$.

(2) $\tfrac{1}{2}\left(x - \tfrac{a}{3}\right) - \tfrac{1}{3}\left(x - \tfrac{a}{4}\right) + \tfrac{1}{4}\left(x - \tfrac{a}{5}\right) = 0$

(3) $\dfrac{x-1}{x-2} - \dfrac{x-2}{x-3} = \dfrac{x-5}{x-6} - \dfrac{x-6}{x-7}$.

(4) $\left(\dfrac{a^2}{x} + b\right)^{\tfrac{1}{3}} - \left(\dfrac{a^2}{x} - b\right)^{\tfrac{1}{2}} = c^{\tfrac{1}{2}}$.

IX.—(1866.)

1. Find the product of the four factors :—

$$x+y+z, \quad x+y-z, \quad x+z-y, \quad z+y-x.$$

Multiply $x^{\tfrac{2}{3}} + x^{\tfrac{1}{3}}y^{\tfrac{1}{3}} + y^{\tfrac{2}{3}}$ by $x^{\tfrac{1}{3}} - y^{\tfrac{1}{3}}$.

Divide $(x+y+z)(xy+xz+yz) - xyz$ by $x+y$.

2. Reduce to its simplest form

$$\frac{x^2 - (y-z)^2}{(x+z)^2 - y^2} + \frac{y^2 - (x-z)^2}{(x+y)^2 - z^2} + \frac{z^2 - (x-y)^2}{(y+z)^2 - x^2}.$$

Find the G. C. M. of

$$2x^5 - 11x^2 - 9 \text{ and } 4x^5 + 11x^4 + 81.$$

3.   Extract the square root of

$$\left(x^2 + \frac{1}{x^2} \right)^2 - 4 \left(x + \frac{1}{x} \right)^2 + 12.$$

And show that

$$(x-y)^3 + (y-z)^3 + (z-x)^3 = 3 \, (x-y)(y-z)(z-x).$$

4.   Solve the equations:—

(a) $$\frac{5-3x}{4} + \frac{5x}{3} = \frac{3}{2} - \frac{3-5x}{3}.$$

(b) $$5x + \frac{.02x + .07}{.03} - \frac{x+2}{9} = 9.5.$$

X.—(1867.)

1.   Reduce to its lowest terms $\dfrac{x^4 - x^3 - x + 1}{x^4 + x^3 - x - 1}$, and find the greatest common measure of $2x^3 + 9x^2 + 4x - 15$ and $4x^3 + 8x^2 + 3x + 20$.

2   Simplify $\left(\dfrac{v^2 + y^2}{v^2 - y^2} - \dfrac{x^2 - y^2}{x^2 + y^2} \right) \div \left(\dfrac{x+y}{x-y} - \dfrac{x-t}{r+y} \right)$ or show

that $\left(\dfrac{b}{c} + \dfrac{c}{b} \right)^2 + \left(\dfrac{c}{a} + \dfrac{a}{c} \right)^2 + \left(\dfrac{a}{b} + \dfrac{b}{a} \right)^2 =$

$4 + \left(\dfrac{b}{c} + \dfrac{c}{b} \right)\left(\dfrac{a}{c} + \dfrac{c}{a} \right)\left(\dfrac{a}{b} + \dfrac{b}{a} \right).$

3.   Prove either of the identities:—

$$(ay - bx)^2 + (cx - az)^2 + (bz - cy)^2 =$$
$$(x^2 + y^2 + z^2)(a^2 + b^2 + c^2) - (ax + by + cz)^2.$$
$$16s(s-a)(s-b)(s-c) = 2a^2b^2 + 2a^2c^2 + 2b^2c^2 - a^4 - b^4 - c^4,$$
$$\text{where } 2s = a + b + c.$$

4.   Solve either of the equations:—

$$(x + \tfrac{5}{2})(x - \tfrac{3}{2}) - (x + 5)(x - 3) + \tfrac{3}{4} = 0.$$

$$\frac{\sqrt{x}+a}{(\sqrt{x}-b)(\sqrt{x}-c)} + \frac{\sqrt{x}+b}{(\sqrt{x}-a)(\sqrt{x}-c)} + \frac{\sqrt{x}+c}{(\sqrt{x}-a)(\sqrt{x}-b)} = 0$$

5. Solve the simultaneous equations:—

$$ax + by + c = 0 \\ a_1 + b_1 y + c_1 = 0 \Big\} \text{ and } \quad \begin{aligned} x + 5y - 4z &= 5 \\ 3x - 2y + 2z &= 14 \\ -10x + 8y + z &= 6 \end{aligned} \Big\}.$$

6. Extract the square root of—

$$x^6 + 8c^4 - 2x^3 + 16x^2 - 8x + 1$$

or $a^4 + b^4 + c^4 + d^4 - 2(a^2 + c^2)(b^2 + d^2) + 2a^2c^2 + 2b^2d^2.$

XI—(1868.)

1 Given $a = \sqrt{2}$, $b = \sqrt{3}$, $c = 4$, and $d = 0$, find the value of $\sqrt{(a^2 + b^2 + c^2)(b^2 + c^2)(b^2 + d^2)}$, and extract the square root of $a^2 + b^2 + c^2 + d^2 - 2a(b - c + d) - 2b(c - d) - 2cd.$

2 Simplify

$$\left(\frac{a+b}{a-b} + \frac{a^2 + b^2}{a^2 - b^2} \right) + \left(\frac{a-b}{a+b} - \frac{a^3 - b^3}{a^3 + b^3} \right) \text{ and shew that}$$

$$1 - \left(\frac{b^2 + c^2 - a^2}{2bc} \right)^2 = \frac{(a+b+c)(a+c-b)(b+c-a)(a+b-c)}{4b^2c^2}.$$

3 Solve the equations.—

$$\frac{4x+3}{9} + \frac{29 - 7x}{12 - 5x} = \frac{8x + 19}{18}$$

and $\dfrac{8x + 4}{\sqrt{x + 5}} = 4\sqrt{x} + 5.$

4. Find the G C. M. of $x^3 + 4x^2 - 5$ and $x^3 - 3x + 2$, and the L C. M. of $x^5 - 5x^3 + v^2 + 4x - 4$ and $x^4 + v^3 - 6x^2 - 4x + 8.$

5. Solve the simultaneous equations:—

$$\tfrac{1}{2}v + \tfrac{1}{2}y = 12 - \tfrac{1}{3}z$$
$$\tfrac{1}{2}y + \tfrac{2}{3}z - \tfrac{1}{2}x = 8$$
$$\tfrac{1}{2}x + \tfrac{1}{2}z = 10.$$

6. There is a number, the sum of whose digits is 5, and if 10 times the digit in the place of tens be added to 4 times the digits in the place of units, the number will be inverted. What is the number?

XII-(1869.)

1. Divide $x^3 + y^3 + 3xy - 1$ by $x + y - 1$, and extract the square root of $x^4 - 3x^3 + 1\frac{1}{2}x^2 + 2x + \frac{4}{9}$.

2. Resolve all the following expressions into factors: $x^4 + 2x^2 + 1$, $x^6 + x^4 - x^2 - 1$, and $x^4 - 1$; and find the lowest common multiple of $6x^2 - x - 1$, $3x^2 + 7x + 2$, and $2x^2 + 3x - 2$.

3. Simplify :—

   (a) $\dfrac{c}{x-a} - \dfrac{x}{x+a} - \dfrac{\dfrac{x+a}{x-a} - \dfrac{x-a}{x+a}}{\dfrac{x+a}{x-a} + \dfrac{x-a}{x+a}}$

   (b) $\dfrac{a^2 + ac}{a^2c - c^3} - \dfrac{a-c}{(a+c)c} - \dfrac{2c}{a^2 - c^2}$.

   (c) $\dfrac{3x^3 - 2x^2 - x}{4x^3 - 2x^2 - 3x + 1}$.

4. Solve the following equations :—

   (a) $\frac{1}{6}(x-2) - \frac{1}{3}(x-4) = \frac{1}{12}(2x-3) - 2\frac{3}{4}$.

   (b) $\dfrac{x}{a} + \dfrac{b}{y} = m$, $\dfrac{b}{x} + \dfrac{a}{y} = n$

5. A labourer is engaged for 30 days on condition that he receives $2s.\ 6d.$ for each day he works, and loses $1s.$ for each day he is idle; he receives $2l.\ 7s.$ in all. How many days does he work, and how many days is he idle ?

XIII—(1870.)

1. Divide $x^8 + x^6 y^2 + x^4 y^4 x^2 y^6 + + y^8$ by $x^4 - x^3 y + x^2 y^2 - xy^3 + y^4$, and $\dfrac{a^3}{b^3} + \dfrac{b^3}{a^3}$ by $\dfrac{a}{b} + \dfrac{b}{a}$.

2. Prove that—

$$\dfrac{1}{1 + \dfrac{1}{a+x}} + \dfrac{1}{1 - \dfrac{1}{a+x}} + \dfrac{2}{1 + \dfrac{1}{a^2 + x^2}} = \dfrac{4a^4}{a^4 - x^4}$$

and show that the notation $\dfrac{\dfrac{a}{b}}{c}$ is of ambiguous meaning.

Simplify the expressions $\dfrac{x^{a+b}.x^{a-b}.x^{c-2a}}{x^{c-a}}$;

$$\dfrac{\dfrac{1+x}{1-x} + \dfrac{4x}{1+x^2} + \dfrac{8x}{1-x^2} - \dfrac{1-x}{1+x}}{\dfrac{1+x^2}{1-x^2} + \dfrac{4x^2}{1+x^4} - \dfrac{1-x^2}{1+x^2}}$$

3. Solve the equations :—

$$\dfrac{x-3}{5} - \dfrac{x-5}{4} = \dfrac{2}{3}; \quad \dfrac{a-x}{a} + \dfrac{2a-x}{2a} = \dfrac{3a-x}{3a}.$$

$$\left\{ \begin{array}{l} \dfrac{1}{5x} + \dfrac{y}{9} = 5 \\[2mm] \dfrac{1}{3x} + \dfrac{y}{2} = 14 \end{array} \right\}.$$

4. Find the least common multiple of $x^3 + x^2y + xy^2 + y^3$ and $x^3 - x^2y + xy^2 - y^3$.

Reduce $\dfrac{2x^4 - x^3 - 9x^2 + 13x - 5}{7x^3 - 19x^2 + 17x - 5}$ to its lowest terms.

5. Extract the square root of—

$$4x^4 + 8ax^3 + 4a^2 x^2 + 16b^2x^2 + 16ab^2 x + 16b^4$$

6. AB is a railway 200 miles long ; and three trains (P, Q,) travel upon it at rates of 25, 20, and 30 miles per hou respectively ; P and Q leave A at 7 A.M. and 8·15 A. M. respectively, and R leaves B at 10·30 A. M. When and where will P be equidistant from Q and R?

XIV—(1871.)

1 Multiply $x^3 - \frac{1}{2}x^2y - 3y^3$ by $2x^2 - \frac{1}{2}y^2$ and find the square

root of $x^4 - 2x^2 - \dfrac{2}{x^2} + \dfrac{1}{x^4} + 3$.

2. Reduce $\dfrac{10x^3 + 9x^2 - 9}{25x^3 - 19x + 6}$ to its lowest terms, and find the

L. C. M. of $2(x-2)^2$, $2x^3 - 8$, $x^3 + 2x^2$, $2x^2 - 4x$.

3. Simplify : —

    (a) $1 + \dfrac{a}{b} - \dfrac{b}{a+b} - \dfrac{a^2}{ab-b^2} + \dfrac{2a^2}{a^2-b^2}.$

    (b) $\left(1 - \dfrac{1}{1+x}\right)\left(x + \dfrac{1}{2+x}\right) \times \dfrac{\dfrac{1}{x^2}-x}{1+\dfrac{1}{x}} \div \left(x + c + \dfrac{1}{x}\right).$

4. Solve the equations :—

    (1) $\dfrac{6}{3x-5} - \dfrac{1}{x-5} = \dfrac{2}{2x-5}.$

    (2) $\begin{array}{l} 4x - \frac{2}{3}(2y-3) = 6\frac{1}{3}; \\ 3y - \frac{3}{5}(3x-1) = 7. \end{array} \Big\}$

5. A and B compared their monthly incomes and found that A's income was to that of B as 7 to 9, and that the third of A's income was Rs. 30 greater than the difference of their incomes. Find what each received.

XV—(1872.)

1. Divide $x^4 - 10x^2 + 9$ by $x^2 - 2x - 3$, and find the G. C. M. of $3x^3 - 17x^2 + 19x + 11$, and $6x^3 - 25x^2 + 17x - 22$.

2. Simplify :—

    (i) $\left\{\dfrac{2a}{x^2-a^2} - \dfrac{1}{x-a} + \dfrac{2}{x+a}\right\} \times \dfrac{x}{x-a+\dfrac{a^2}{x}}$

    (ii) $\dfrac{1}{x(x-y)(x-z)} \div \dfrac{1}{y(y-x)(y-z)} + \dfrac{1}{z(z-x)(z-y)}.$

3. Solve the equations :—

    (i) $\dfrac{7x-1}{4} = \dfrac{1}{3}\left(2x - \dfrac{1-x}{2}\right) = 6\frac{1}{3}.$

    (ii) $\begin{array}{l} \dfrac{x-y}{3} = \dfrac{y-1}{4} \\ \dfrac{4x-5y}{7} = x - 7. \end{array} \Bigg\}$

4. Rs. 1,100 are so divided among A, B and C, that if A were to give B Rs. 200, B would have twice as much as A, and three times as much as C. How many rupees did A, B, and C each receive originally?

5. If $a : b :: c : d$ prove that $a : b :: a \pm c : b \pm d$; also show that $a^2 \pm c^2 : b^2 \pm d^2 :: (a \pm c)^2 : (b \pm d)^2$.

XVI—(1873.)

1. Reduce to their simplest forms:—

(i) $\dfrac{3x}{2} \sqrt[4]{\dfrac{400 y^2}{81 x^2}}$.

(ii) $\dfrac{(x^3 - y^3)}{(x^2 + xy + y^2)} \dfrac{(x + y)^2}{(x^2 - y^2)}$.

(iii) $\dfrac{2 + x}{2(x + 1)} + \dfrac{2 - x}{2(x - 1)} + \dfrac{}{x} + 1$

2. Find the G. C. M. of $x^4 - 9 a^2 x^2 + 10 a^3 x$ and $a x^3 - a^2 x^2 - 4 a^4$; and the L. C. M. of $3 a x^2 - 3 a^2 x$, $x^2 - a^2$, $x^2 + a x$, $\sqrt{(3 a x)}$, $\sqrt{x} - \sqrt{a}$.

3. Solve the equations:—

(a) $\dfrac{12}{x + 2} = 6 - 2 \left(\dfrac{3x + 2}{x + 1} \right)$.

(b) $\sqrt{x} - \sqrt{4 + x} = -\dfrac{2}{\sqrt{x}}$.

(c) $2x - \dfrac{2y - 1}{3} = 3\frac{5}{7} + \dfrac{3x - 2y}{4}$

$4y - \dfrac{5 - 2x}{4} = 6 - \dfrac{3 - 2y}{5}$

4. If $\dfrac{a}{b} = \dfrac{c}{d} = \dfrac{e}{f}$, then each of these ratios $= \dfrac{a + c + e}{b + d + f}$.

Assuming $\dfrac{a + b - c}{a + b} = \dfrac{b + c - a}{b + c} = \dfrac{c + a - b}{c + a}$, and that $a + b + c$ is not $= 0$, show that $a = b = c$.

5. Two persons started at the same time from A. One rode on horseback at the rate of $7\frac{1}{2}$ miles an hour and arrived at B 30 minutes later than the other who travelled the same distance by train at the rate of 30 miles an hour. Find the distance between A and B.

XVII--(1874.)

1. Simplify (i) $\dfrac{x^{m+2n}\, x^{3m-8n}}{x^{5m-6n}}$.

   (ii) $\dfrac{a}{a+b} - \dfrac{a+b}{2b} + \dfrac{a^2+b^2}{2b(a-b)}$.

   (iii) $\dfrac{\dfrac{a^3}{b^3} - \dfrac{b^3}{a^3}}{\left(\dfrac{a}{b}-\dfrac{b}{a}\right)\left(\dfrac{a}{b}+\dfrac{b}{a}-1\right)} \times \dfrac{\dfrac{1}{b}-\dfrac{1}{a}}{\dfrac{1}{a^2}+\dfrac{1}{b^2}+\dfrac{1}{ab}}$.

2. Find the least common multiple of $1+4x-4x^2-16x^4$ and $1+2x-8x^3-16x^4$.

   Extract the square root of—

   $$9x^4-2x^3y+1\tfrac{63}{64}x^2y^2-2xy^3+9y^4.$$

3. Solve the equation $\dfrac{15-\frac{2}{3}x}{3} - \dfrac{2x+5}{2\frac{1}{2}} = \dfrac{17-1\frac{1}{2}x}{3}$

   The expression $ax-3b$ is equal to 30 when x is 3, and to 42 when x is 7; what is its value when x is 4·3; and for what value of x is it zero?

4. Show that if $a:b::c:d$.

   (i) $a\pm b : a\mp b :: c\pm d : c\mp d$,

   (ii) $4(a+b)(c+d) = bd\left(\dfrac{a+b}{b} + \dfrac{c+d}{d}\right)^2$

5. A certain number consists of two digits; the left-hand digit is double the right-hand digit, and if the digits be inverted the ratio of the number thus formed to 60 is 4 : 5. Find the number.

XVIII.—(1875.)

1. Subtract $3a-\frac{2}{3}b+\frac{1}{3}c$ from $2a+\frac{1}{3}b-\frac{1}{4}c$; multiply

$$\frac{v^2}{y^2}+1+\frac{y^2}{x^2} \text{ by } \frac{x}{y}-\frac{y}{x}; \text{ and find the greatest com-}$$

mon measure of $6x^4+x^3-6x^2-5x-2$ and $2x^4+3x^3+2x^2-7x-6$.

2. Simplify—

$$\frac{1+x+x^2}{1-x^3}+\frac{1-x+x^2}{1+x^3}-\left(\frac{x}{1+x}+\frac{1-x}{x}-\frac{1+x}{x}\right)\times\frac{1}{1-x},$$

and show that if $\frac{a-b}{c}+\frac{b-c}{a}+\frac{c+a}{b}=1$ and $a-b+c$ is

not 0, then $\frac{1}{a}=\frac{1}{b}+\frac{1}{c}$.

3 Solve the equations :—

(i) $\frac{x-\frac{1}{2}}{5}-\frac{7x-3}{6}+\frac{3}{7}=0.$

(ii) $\sqrt{5x-1}=1+\sqrt{5x-2}.$

(iii) $4x-\frac{1}{3}(5y-4)=1$
      $\frac{3y-2x}{1}+\frac{1}{3}x=\frac{1}{2}.$ $\Big\}$.

If $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}$ prove that each of the fractions is equal to

(i) $\frac{ka+lc+me}{kb+ld+mf}$ (ii) $\left\{\frac{ace}{bdf}\right\}^{\frac{1}{3}}.$

How many bundles of hay at Rs. 5 per thousand must a *ghaswala* mix with 5,600 bundles at Rs 6 per thousand in order that he may gain 20 per cent. by selling the whole at 11 annas per hundred ?

XIX—(1876.)

1   Simplify the following expressions :—

    (i) $3a-[a+b-2\{a+b+c-(a-b+c-d)\}+a]$.

    (ii) $(x-y)^3+(x+y)^3+3(x-y)^2(x+y)+3(x+y)^2(x-y)$.

    (iii) $\dfrac{\dfrac{a}{a-b}-\dfrac{a}{a+b}}{\dfrac{b}{a-b}-\dfrac{b}{a+b}} \div \dfrac{\dfrac{a+b}{a-b}+\dfrac{a-b}{a+b}}{\dfrac{a+b}{a-b}-\dfrac{a-b}{a+b}} \times \dfrac{a^2}{a^2+b^2}$.

Find the Greatest Common Measure of $2x^3+3x^2+2c-2$ and

   $4x^4-2x^3+2x-1$.

Multiply x^2-x+1 by $-\dfrac{1}{x^2}+\dfrac{1}{x}+1$.

Find the square root of $\left(1-4c+2b+c^2-bc+\dfrac{b^2}{4}\right)$

Solve the equations :—

    (i) $\dfrac{2x-13}{9}-\dfrac{x-1}{11}=\dfrac{x}{8}+\dfrac{x}{7}-9$.

    (ii) $\left.\begin{array}{l}\dfrac{x+y}{2}+\dfrac{3x-5y}{4}=2.\\[2mm] \dfrac{x}{14}+\dfrac{y}{.18}=1.\end{array}\right\}$.

4   If $\dfrac{a}{b}=\dfrac{c}{d}=\dfrac{e}{f}$, show that

    (i) $\dfrac{ma+nb}{mc+nd}=\dfrac{b^2c}{d^2a}$.

    (ii) $a^2+c^2+e^2:b^2+d^2+f^2::ce:df$.

5   A can do a peice of work in 9 days, B in twice that time, C can only do ¾ as much as in a day; how long would A, B and C, working together require to do the same piece of work ?

XX—(1877.)

1. Simplify $\dfrac{x+2}{1+x+x^2} - \dfrac{x-2}{1-x+x^2} - \dfrac{2x^2-4}{1-x^2+x^4}$.

Multiply together $a+b+c$, $b+c-a$, $c+a-b$, $a+b-c$; and divide $x^4 + x^3 - 24x^2 - 35x + 57$ by $x^2 + 2x - 3$.

2. Solve the equations :—

   (i)

   (ii) $2(x+2) = 1 + \sqrt{4x^2 + 9x + 14}$

   (iii) $\begin{cases} 3x + 4y = 11 \\ 5y - 6z = -8 \\ 7z - 8x = 13. \end{cases}$

3. Find the Greatest Common Measure of

   $x^4 + x^3 - 11x^2 - 9x + 18$ and $x^4 - 10x^3 + 35x^2 - 50x + 24$.

4. Find the first four terms of the square root of $a^2 + c^2$, and from the result deduce the square root of 101 correct to six places of decimals.

5. If $a : b :: c : d$, prove that $a^2 + c^2 : b^2 + d^2 :: ac \ bd$.

6. A and B together can do a piece of work in 15 days; A can do it alone in 24 days; how long would B take to do it alone ?

7. Two passengers have together 5 cwt, of luggage, and are charged for the excess above the weight allowed 5s. 2d. and 9s. 10d. respectively; but if the luggage had all belonged to one of them he would have been charged 19s. 2d. How much luggage is each passenger allowed to carry free of charge ? and how much luggages had each passenger ?

XXI—(1878.)

1. Divide

$$x(1 + y^2)(1 + z^2) + y(1 + z^2)(1 + x^2) + z(1 + x^2)(1 + y^2) + 4xyz$$

by $1 + xy + yz + zx$.

2. Extract the square root of

$$(a^2 + b^2 + c^2)(x^2 + y^2 + z^2) - (bz - cy)^2 - (cx - az)^2 - (ay - bx)^2$$

3. If $\dfrac{x}{b + c - a} = \dfrac{y}{c + a - b} = \dfrac{z}{a + b - c}$, find the value of $(b - c)x$

$+ (c - a)y + (a - b)z$.

4. Solve the equations :—

(a) $\sqrt{4x^2 + 20x + 17 - \sqrt{16x^2 + 11x + 10}} = 2(x + 2)$.

(b) $\dfrac{4x + 3}{9} + \dfrac{13x}{108} = \dfrac{8x + 19}{18}$.

5. Simplify the expression:—

$$\dfrac{1}{(4x^3 - 3x)^2} - \left\{ \dfrac{\dfrac{3\sqrt{1 - x^2}}{x} - \dfrac{(1 - x^2)^{\frac{3}{2}}}{x^3}}{1 - 3\left(\dfrac{1 - x^2}{x^2}\right)} \right\}^2$$

XXII—(1879.)

1. Multiply $a^{2n} - a^n x^n + x^{2n}$ by $a^n + x^n$, and find the greatest common measure of $x^2 + \frac{7}{6}x + \frac{1}{3}$ and $x^2 + \frac{1}{3}x + \frac{1}{12}$.

2. Divide $x^{2n} - y^{2n}$ by $x^{2n} - y^{2n}$, and

simplify $\dfrac{x - y}{x - z} + \dfrac{x - z}{x - y} - \dfrac{(y - z)^2}{(x - y)(x - z)}$.

3. Solve the equations :—

(a) $x - k + \sqrt{k^2 + x^2} = m.$

(b) $\begin{cases} a^x \cdot a^{y+1} = a^7. \\ a^{2y} \cdot a^{3x+5} = a^{20}. \end{cases}$

(c) $\begin{cases} \dfrac{4}{x} + \dfrac{10}{y} = 2 \\ \dfrac{3}{x} + \dfrac{2}{y} = \dfrac{19}{20}. \end{cases}$

4 If $\dfrac{a}{b} = \dfrac{c}{d}$ prove that $\dfrac{a^2 + b^2}{a^2 - b^2} = \dfrac{ac + bd}{ac - bd}.$

5. Two armies number 11,000 and 7,000 men respectively, before they fight each is reinforced by 1,000 men : in favour of which army is the increase ?

6 From two towns 561 miles apart two men start, one from each, at the same time : one goes 24 and the other 27 miles a day ; in how many days will they meet ?

ENTRANCE-EXAMINATION PAPERS.

ALGEBRA.

I—(1857.)

1 Find the value of $a^3 + b^3 + c^3 + 3abc$, when $a = 1, b = 4, c = 5$.

2 Divide $x^2 + xy + y^2$ by $x + \sqrt{xy} + y$.

3. Solve the equations :—

   (1) $\dfrac{x}{5} + \dfrac{x-3}{4} = \dfrac{x+1}{2} - \dfrac{x-1}{7}$.

   (2) $x(y+z) = 22$,

   $y(z + x) = 40$,

   $z(x + y) = 42$.

4. A train running from A to B meets with an accident 50 miles from A, after which it moves with $\frac{3}{4}$ths of its original velocity and arrives at B 3 hours late. Had the accident happened 50 miles further on, it would have been only 2 hours late. Find the distance from A to B, and the original velocity of the train.

II—(1858.)

1 Find the numerical value of

$$\left\{ a-(b-c) \right\}^2 + \left\{ b-(c-a) \right\}^2 + \left\{ c-(a-b) \right\}^2.$$

when $a = 1, b = 3, c = 5$.

2. Expand and simplify the quantities in the preceding question.

3. Find the square root of $1 + 2x - x^2 - \frac{1}{2}x^3$.

4   Solve the equation

$$\frac{c}{a} + \frac{y}{b} = 1 - \frac{x}{c}, \quad \frac{y}{a} + \frac{x}{b} = 1 + \frac{v}{c}.$$

5. A number of two digits when divided by their sum gives the quotient 4; but if the digits be inverted and the number thus formed be increased by 12, and then divided by their sum, the quotient is 8. Find the number

6   Explain what is meant by $a : b : : c : d$, and from the principles here involved, deduce the common Rule of Three.

MADRAS UNIVERSITY

MATRICULATION EXAMINATION PAPERS.

ALGEBRA.

I.—(1859.)

1   Prove that $-a \times -b = +ab$; and $a^{\frac{1}{2}} = \frac{1}{\sqrt{a}}$.

2   Divide $1 - \frac{x}{2}$ by $1 - \frac{x}{3} - \frac{x^2}{4}$ to 5 terms.

3. Resolve the following algebraic quantities into their elementary factors, $x^6 - a^6$; $x^2 - 9x + 14$.

4. Solve the following equations :—

(i) $6x - a : 4x - b : : 3x + b : 2x + a$.

(ii) $x - y - z = 4$, $3y - x - z = 16$, $17x - y - z = 22$.

5. A can do a piece of work in 12 days; when he has been at work in 4 days, B is sent to help him, and they finish it together in 3 days. In how many days could B do the whole?

II.--(1860.)

1. Divide $x^4 + 3x^3y - x^2(y - 6y^2) - 3xy^2 + (15x - 1)y^3 + 5y^4$ by $x^2 + 3xy + y^2$.

2. Prove $x^{-6} = \dfrac{1}{x^6}$.

3. In the following equation shew that the value of x is independent of a.

$$\frac{x + a}{a + b} + \frac{x + b}{a - b} \qquad \frac{(a + b)^2}{a^2 - b^2}.$$

4. Find x and y from the following equations :—

$$\sqrt{x} + \sqrt{y} = 2, \quad x + y = 3.$$

5. Two years after the flood, when Shem had lived a sixth of his life, he begot Arphaxed; who, when he was thirty-five years old, begat Salah–When Salah had lived a twentieth of Shem's life he begot Eber, who after thirty-four years begat Peleg. Peleg begat Ren at the same age as Salah begat Eber. Ren was two years older when he begat Serug. Serug begat Nahor at the same age as Peleg begat T̶E̶R̶A̶H̶, who when he had lived $\frac{5}{70}$ths of the years of Shem's life, begat Abram. Abram was born 292 years after the flood and lived 175 years. By how many years did Abram survive Shem or Shem Abram?

III—(1861.)

1. Multiply $x^4 + 7x^3y - 8x^2y^2 - 13xy^3 + 5y^4$ by $6x^2y - 3y^2 x$.

2. What is the numerical value of

$$\frac{x - y}{4} \times \frac{z - 4}{x} + \frac{x}{y} - \frac{y}{z}, \text{ if } x = 6, \ y = 3, \ z = 5.$$

3 . Simplify the expressions :—

$$\sqrt[6]{\left\{\left(\frac{a^4-a^4}{c^2+a^2}\right)^3\right\}^{-4}} \text{ and } \left\{\left(\sqrt[3]{\frac{}{x}}.\sqrt{y.z}\right)^4\right\}^{\frac{1}{3}}$$

4. Separate into factors $a^4+2a^3x-2ax^3-x^4$.

5 Find the cube root of $\frac{1}{8}a^3-\frac{1}{4}a^2b+\frac{1}{6}ab^2-\frac{1}{27}b^3$

6. Add together $\dfrac{4a+6b}{a+b} + \dfrac{6a-4b}{a-b} - \dfrac{4a^2+6b^2}{a^2-b^2} + \dfrac{4b^2-6a}{a^2+b^2}$

What will be the value of the sum (1) if $a=b$, (2) if $a=-b$
(3) if $a=b(2+\sqrt[3]{5})$, (4) if $a=2$, $b=0$.

7. At the last Matriculation, a fourth part of the candidates and six more passed in the Second Division, a thirteenth part in the First, and three more than half failed. How many candidates were examined ?

8. A man has in his purse sovereigns and shillings. If he receive as many sovereigns as he has in his purse, and pay away his shillings and an equal number of sovereigns he will have eight coins. But if he double the number of his shillings, retaining the original number of sovereigns, he will have nine coins. How many sovereigns and how many shillings were in his purse at first ?

9. Solve the following equations :—

(i) $\dfrac{x-4}{x-2} + \dfrac{x+3}{} = 2.$

(ii) $\dfrac{x-a}{a}. \quad \dfrac{x-b}{b} \qquad = 1.$

(iii) $\dfrac{x}{ab} + \dfrac{x}{bc} + \dfrac{x}{ca} = a+b+c.$

(iv) $\sqrt{x^2+4x+4} = 3x-5.$

IV—(1862.)

1. Add together $2a^3 + 4a^2 + 6ab$, $a^2 + b^2$, $ab^2 + b^3$, $3a^2b - a^3$, $ab^2 - 4ab - 2a^2$, $ab^2 + a$, $b - 2a^2$ and reduce the sum to its simplest form.

2. Divide $a^2b^2x^2y^2 - a^2cx \cdot y + 3b^3xy^2 - 3bc.cy + (b^2cy - c^2)y$ by $b^2y^2 - cy$, and square the quotient.

3. What are the numerical values of
$$\sqrt[3]{2a^3 + a^2 + a}, \quad \sqrt[2]{2a^3 + a^2 - a} \text{ and } \sqrt[3]{\frac{1}{a^3} + \frac{1}{a^2} - \frac{2}{a}},$$
when $a = \frac{1}{2}$.

4. What are the naught, first, second, and fourth powers of $\sqrt{4a^2 - 4ax^2 + x^4}$? What is the square of the quantity whose square root is a?

5. Find the square root of $16m^2x^2 + 36n^2y^2 + 9p^2z^2 + 48mnxy + 36npyz + 24mpxz$.

6. Solve the following equations:—

   (i) $x^2 - x - 12 = (3 + x)(31 - 4x)$.

   (ii) $\dfrac{ax}{b} + \dfrac{bx}{c} + \dfrac{cx}{a} = \dfrac{(ab^2 + bc^2 + ca^2)^2}{a^2b^2c^2}$.

   (iii) $2x + 3y = 5x - \frac{1}{2} = 4y + \frac{5}{8}$.

7. Two trains start at the same time from A and B for the C junction. The train from A should run at 24 miles an hour and reach the junction half an hour before that from B, which travels 18 miles an hour. But the former is so retarded as only to run at an average rate of 22 miles an hour. The two trains arrive at the junction at the same time. How far are A and B respectively from C, and how long were the trains upon the road?

8. A and B went out to shoot: A shot three pheasants for every 5 partridges; B five pheasants for every 9 partridges. A shot four birds to B's five; how many pheasants and how many partridges had they brought down, when they had shot 126 birds?

V—(1863.)

1. Simplify $(a+b+c)(a-b+c)-\{(a+c)^2-b^2-(a^2+b^2+c^2)\}$.

2. Multiply

   (i) x^2+3x+9 by x^2-3x+9.

   (ii) $a+a^{\frac{1}{2}}b^{\frac{1}{2}}+b$ by $a^{\frac{1}{2}}+b^{\frac{1}{2}}$.

3. Divide

   (i) x^3-7x-6 by $x-3$.

   (ii) $a^{-3}+b^{-3}$ by $a^{-1}+b^{-1}$.

4. Find the square-root of

   (i) $x^6+14x^3-4x^4-28x+4x^2+19$.

   (ii) $a+b+c+2\sqrt{ab}-2\sqrt{bc}-2\sqrt{ca}$.

5. Find the cube of $a+b-c$, using factors, not direct multiplication.

6. Solve the following simple equations:—

   (i) $\dfrac{7x+5}{3} - \dfrac{24-4x}{5} +5 = \dfrac{3x+7}{2}$.

   (ii) $\dfrac{x-a}{b} + \dfrac{x-b}{c} + \dfrac{x-c}{a} = \dfrac{x-(a+b+c)}{abc}$.

   (iii) $ax+by=c,\ a_1x+b_1y=c_1$.

   (iv) $3x+2y=1\cdot4,\ 5x-\cdot1y=1\cdot99$.

   (v) $\dfrac{1}{x}+\dfrac{1}{y}=3,\ \dfrac{1}{y}+\dfrac{1}{z}=4,\ \dfrac{1}{z}+\dfrac{1}{x}=5$.

7. A merchant goes to three bazaars in succession. At the first he gains 15 per cent. on his capital : at the second 20 per cent. upon this increased capital : and at the third 25 per cent. on what he then possessed : on his return home he finds that he has gained Rs. 2,639. What was his original capital?

8. A certain fraction becomes $\frac{1}{2}$ when 1 is added to its denominator, and $\frac{1}{6}$ when 2 is taken away from its numerator: what is the fraction?

VI -(1864.)

1. If $a=1$, $b=2$, $c=3$, $d=0$ find the value of

(i) $\dfrac{a^2b + b^2c + c^2d + d^2a}{(a+b)(c+d) - \{(a-d) + (c-b)\}}$.

(ii) $3\sqrt{b-a} + \sqrt[3]{4(c-a)} - \sqrt[4]{3(8a + 5b + 3c - 2d)}$.

2. Simplify the following expression :—

$\{2x^2 - y(3x - y) + c + (y-1)\} - \{2(x+y) + 3(y+1)(y-1) + 2\cdot(x-2y)\} + [(x-y+1) - \{xy - 2(y^2 + y - 2)\} + 2]$.

3. Multiply $a^3 - 4a^2b + 4a^1b^2 - b^3$ by $a^2 - 2a^1b + b^2$.

4. Divide $(a^2 - b^2)x^2 + (a^2 - b^2)y^2 - 2(a^2 + b^2)xy$ by $(a+b)x - (a-b)y$, without removing the brackets.

5. Find the square root of

$a^2 + 4b + 9\sqrt[3]{c^2} + 4\sqrt{a^2b} - 6a\sqrt[3]{c} - 12\sqrt[6]{b^5c^2}$.

6 Find the G. C. M. of $a^5 - 3a^4b + 4a^3b^2 - 5a^2b^3 + 3ab^4 - 2b^5$ and $2a^4 - 3a^3b - a^2b^2 - 2ab^3$.

7. Reduce the following expressions to their simplest forms :—

(1) $\dfrac{x^2 + x - 12}{x^2 + 7x + 12}$.   (2) $\dfrac{1}{a+x} + \dfrac{1}{a-x} + \dfrac{2a}{a^2 + x^2}$.

(3) $\dfrac{\dfrac{a}{a+b}}{\dfrac{a}{a-b}} + \dfrac{\dfrac{b}{a-b}}{\dfrac{b}{a+b}}$

8. • Solve the following equations:—

(i) $\dfrac{x^2 - a}{x - \sqrt{a}} + \dfrac{x^2 - a}{x + \sqrt{a}} = x - \dfrac{x - \sqrt{a}}{2}$.

(ii) $\begin{cases} 2x - a - \dfrac{y - b}{a + b} = a \\[2mm] 2y - b + \dfrac{x - a}{b} = 2b - y. \end{cases}$

(iii) $xyz = (xy + zx - yz) = 4(yz + xy - zx) = 6(xz + yz - xy)$.

9. A merchant speculated in 20 voyages. On examining his accounts he found that, on an average, in each prosperous voyage he had gained a sum equal to $\frac{1}{6}$ of his original capital, and that in each adverse voyage he had lost a sum equal to $\frac{1}{4}$th of the same On the whole however, his capital was increased by $\frac{5}{12}$ of itself. How many prosperous voyages did he make?

VII—(1865.)

1. Find the continued product of

$x + \sqrt{3x} + 4,\ x^2 - 3x + 9\ and\ x - \sqrt{3x} + 3$.

2 Simplify the following expressions :—

(i) $\dfrac{a^2}{(x - a)^n} + \dfrac{2a}{(x - a)^{n-1}} + \dfrac{1}{(x - a)^{n-2}}$,

(ii) $\dfrac{a + b - c}{c - a} - \dfrac{a + b + c}{c - b} + \dfrac{(a + b + c)(a - b)}{c^2 - (a + b)c + ab}$.

3. Resolve each of the following expressions into three factors :—

(i) $b^3 - a^3 - (c^2 - ab)(b - a)$.

(ii) $a(b^2 + c^2 - a^2) + b(a^2 + c^2 - b^2)$.

4. Find the value of $\dfrac{(x - a)(x - b)}{(x - a - b)^2}$ when $x = \dfrac{a^2 + ab + b^2}{a + b}$.

5. Shew that $\left(\dfrac{1}{a} - \dfrac{1}{c} \right)^2 + \dfrac{4}{(a+c)^2} = \left(\dfrac{a+c}{ac} - \dfrac{2}{a+c} \right)^2$.

6. Find the Least Common Multiple of

$x^3 - 7x - 36$, $x^3 - 13x - 12$, and $x^2 + 4x + 3$.

7. Solve the following equations :—

(i) $\dfrac{3x+5}{x+1} = \dfrac{4x+8}{3x+3} + \dfrac{10x+1}{6x+3}$.

(ii) $\sqrt{c^2 + 9c} - \sqrt{x^2 - 8x} = \sqrt{x}$.

(iii) $\begin{cases} ax + by + cz = a + b + c, \\ \dfrac{ax}{b+c} + \dfrac{by}{a+c} = 1, \quad \dfrac{2c}{b+c} + \dfrac{2y}{a+c} = \dfrac{1}{a} + \dfrac{1}{b}. \end{cases}$

8. A, B and C work together at building a wall for 10 days, after which B stops working and A and C together finish it in 5 days. Find the time in which each can build it separately, if A and B together can do as much in a day as C can do in three days, and 3 days' work of B is equal to 4 days' work of C.

VIII.—(1865.)

1. Prove that $(a^2 + ab + b^2)(c^2 + cd + d^2) = (ac + ad + bd)^2$

$+ (ac + ad + bd)(bc - ad) + (bc - ad)^2$.

2. Divide

(i) $2x^3 - 9ax^2 + 11a^2x - 6a^3$ by $x - 3a$.

(ii) $8x - 8x^{\frac{2}{3}}y^{\frac{1}{3}} + 4x^{\frac{1}{3}}y^{\frac{2}{3}} - y$ by $2x^{\frac{1}{3}} - y^{\frac{1}{3}}$.

3. Find the square root of

(i) $a^2 + \dfrac{1}{a^2} - 2\left(a + \dfrac{1}{a} \right) + 3$

(ii) $a^{-4} + b^4 - a^{-2}b^{-2} + 2a^{-3}b^{-1} - 2a^{-1}b^{-8}$.

4. Find the G. C. M. of

     $4x^4 + 9x^3 + 2x^2 - 2x - 4$ and $3x^3 + 5x^2 - x + 2$.

5. Find the L. C. M. of $3x^2 - 5x + 2$ and $4x^3 - 4x^2 - x + 1$.

6. Shew (1) that if P divide A, it will also divide mA, and (2) that if P divide A and B, it will also divide mA $\pm$ nB.

7. Simplify the following fractions:—

    (i) $\dfrac{3a^4 - a^2 b^2 - 2b^4}{10a^4 + 15a^3 b - 10a^2 b^2 - 15ab^3}$.

    (ii) $\dfrac{1}{a - \sqrt{a^2 - x^2}} - \dfrac{1}{a + \sqrt{a^2 - x^2}}$.

8. Solve the following equations:—

    (i) $\dfrac{6x + 18}{13} - 4\dfrac{5}{6} - \dfrac{11 - 3x}{36} = 5x - 18 - \dfrac{13 - x}{12} - \dfrac{21 - 2x}{18}$.

    (ii) $\dfrac{3 - 3x}{2} - \dfrac{2 - 2x}{3} = \dfrac{1 - x}{4}$.

    (iii) $\dfrac{x - 1}{\sqrt{x + 1}} = 1 + \dfrac{\sqrt{x - 1}}{2}$.

    (iv) $\begin{cases} 5x + 2y + z = 30 \\ \dfrac{x}{2} + \dfrac{4y}{5} - \dfrac{z}{10} = 4 \\ 2x + 5y + 10z = 129. \end{cases}$

9. A and B start together on a certain journey. When they have walked a distance of a mile, A finds it necessary to return home, and goes at twice his former rate. He then starts again at $\dfrac{m}{n}$ times his original pace, and just at the end of the journey overtakes B, who, since A left him, had gone at $\dfrac{n}{m}$ times the original pace. How long was the journey?

IX.—(1866.)

1. Reduce to its simplest form

$$\frac{x^3-1}{x^3+1} + \frac{x^3+1}{x^3-1} - \frac{2x^4}{x^4+x^2+1}.$$

2. Divide $(a+b)(b+c)x^3 + \{(b+c)^2+(a+b)^2\}x^2 + (b+c)(a-b).c^2 + (a+b)(a+c)x - (a+c)(b+c)$ by $(b+c)x^2+(a+b)x -(b+c)$.

3. Find the square root of

$$a^4 + \frac{1}{a^4} + a^2 + \frac{1}{a^2} + 2\left\{a^3-\frac{1}{a^3}-\left(a-\frac{1}{a}\right)\right\}$$

4. Find the G. C. M. of x^5-2x^4-x-1 and x^5+2x^3+x+1.

5. Prove that every common multiple of a and b is a multiple of their least common multiple.

6. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ prove that

$$\frac{a^3}{b^3} = \frac{pa^3+qc^3+re^3}{pb^3+qd^3+rf^3}.$$

7. Solve the following equations :—

(i) $\frac{x-1}{3} + \frac{1\frac{1}{2}-2x}{4\frac{1}{2}-5x} = \frac{1}{3}(2x-1) + 2 - \frac{7}{18x+6} - \frac{7x}{6x+2}$

(ii) $x+y=2(z+1),\ y+z=x+1,\ z+x=3y+1,$

8. If $\frac{a}{b} + \frac{c}{d} = \frac{b}{a} + \frac{d}{c}$, prove that

$$\frac{a^3}{b^3} + \frac{c^3}{d^3} = \frac{b^3}{a^3} + \frac{d^3}{c^3}.$$

9. A, B, C start at the same instant from P to run to Q, their rates being such that B is always as much behind A as he is in advance of C. After A has reached Q he returns at once to P at the same rate, and meets B at a point whose distance from Q is equal to one-fourth of PQ, shew that A meets C at a distance from P equal to one-third of PQ.

X.—(1867.)

1. Divide $(m+n)a^4 + (m^2-1+n^2+2mn)a^3 - (m+n)(1-2mn)a^2 + (m-2mn+n)a-1$ by $(m+n)a-1$, without removing the brackets.

2. If $x + \dfrac{1}{x} = 2(a+m$

$x - \dfrac{1}{x} = 2b.$

$y + \dfrac{1}{y} = 2(c+d$

$y - \dfrac{1}{y} = 2d.$

Find the value of $xy + \dfrac{1}{xy}$.

3. Simplify these expressions:—

(i) $\dfrac{ab}{a+b}\left(3c + \dfrac{b}{a}\right) - \dfrac{b^2}{(a+b)^3}(a^2+b^2) - 2a\left(\dfrac{b}{a+b}\right)$

(ii) $\dfrac{\dfrac{(a+b)^2 + (a-b)^2}{b-a} - (a-b)}{\dfrac{1}{b-a} - \dfrac{1}{a+b}} \div \dfrac{(a+b)^3 + (b-a)^3}{(a+b)^2 - (a-b)^2}$.

4. Find the G. C. M. of $x^3 - 4x^2 + 5x - 4$ and $x^4 - x^3 + x - 1$.

5. If $ap = bq = cr$, show that $\dfrac{p^2}{qr} + \dfrac{q^2}{pr} + \dfrac{r^2}{pq} = \dfrac{bc}{a^2} + \dfrac{ac}{b^2} + \dfrac{ab}{c^2}$.

6. Find the L. C. M. of

$$x^4 + 4x^2 - 5 \; ; \; x^2 - 4x + 3 \text{ and } 2x^3 + x^2 - 8x + 5.$$

7. Solve these equations —

(a) $\dfrac{6-5x}{5} - \dfrac{3}{14} \cdot \dfrac{(7-2x^2)}{(x-1)} - 1\tfrac{1}{10} = -\dfrac{1+3x}{7} - x + \dfrac{1}{35}$

(b) $\dfrac{7abc}{a+b+c} + \dfrac{(a^2+b^2+c^2)x}{(a+b+c)^2} + \dfrac{2abc(ab+ac+bc)}{(a+b+c)^3} = 8x.$

(c) $(a-b)x + (b-c)y + cz = 1$

$2ax + by + \tfrac{3}{2}cz = 2$

$(a+b-c)x + (a-2b+2c)y + 2bz = 3.$

8. A alone can do a piece of work in a hours. A and C together can do it in b hours, and C's work is $\frac{1}{n}$th of B's. The work has to be completed in c hours. Find (i) how long after A has commenced B and C should *relieve* him, so as to finish the work in time; (ii) how long after A has commenced B and C should *join* him so that the three working together might just complete the work in time?

XI—(1868.)

1. Divide $bc(c-b) + ac(a-c) + ab(b-a)$ by $(a-b)(a-c)$.

2. Resolve the first of the following expressions into two factors and the second into four factors.

(1) $x^4 + x^2 + 1.$

(2) $a(b^3 - c^3) + bc(c^2 - a^2) + a^3(c-b).$

3. *State* in what cases $x^n + a^n$ will be divisible by $x + a$ and $x^2 + a^2$ respectively; state also the number of terms in the quotient in each case.

Shew that the last digit in $3^{2n+1} + 2^{2n+1}$ is 5 if n be any whole number.

4. Simplify the following expressions : —

(i) $\dfrac{1}{x^2+x+1} + \dfrac{2x}{x^4+x^3+1}$.

(ii) $\dfrac{b+c-2a}{b-a} - \dfrac{(b-c)^2}{(a-b)(a-c)} + \dfrac{b+c-2a}{(c-a)}$.

5 Find the G. C. M. of $x^3 -7x+6$ and $6x^3-7x^2+1$.

6. If $x = \dfrac{2ac}{a+c}$ shew that the value of $\dfrac{(x-a)^2+(x-c)^2}{a^2+c^2}$

$+ \dfrac{4ac}{(a+c)^2}$ is the same for all values of a and c.

7. Solve the following equations :—

(i) $\dfrac{1-4x}{5} + \dfrac{5}{9} - \dfrac{3-7c}{4} = x$.

(ii) $ax-by = a-b,\ \dfrac{x}{2a} + \dfrac{y}{2b} = \dfrac{1}{a+b}$.

(iii) $\sqrt{y} - \sqrt{y-2x} = \sqrt{48-2x},\ y(x-15) = 36$.

8. A room of which the floor is rectangular is such that the addition of a foot to the height will increase the area of the walls as much as the addition of a foot to both the length and breadth, the increase in each case being 60 square feet ; and if the floor be made square, the peremeter remaining the same as before, its area will be increased by 9 square feet. Find the length, breadth, and height of the room.

XII—(1869.)

1. Simplify

$(\sqrt{1-a^2}\sqrt{1-x^2} + ax)^2 - 2ax(\sqrt{1-a^2}\sqrt{1-x^2} + ax) + x^2$.

2. Divide $x^{10} - a^5x^5 + a^{10}$ by $x^2 + ax + a^2$.

3. Shew that $b^2 - ac$ is a factor of

$(2b^2 + a^2 - ac)(2b^2 + c^2 - ac) - b^2(a+c)^2$, and that the other factor is positive for all values of a, b, and c.

4. Simplify the following:—

(i) $\dfrac{1 + \frac{1}{2} \cdot \frac{x}{a}}{\left(1 + \frac{x}{a}\right)^2} + \dfrac{1 + \frac{3}{2} \frac{a}{x}}{\left(1 + \frac{a}{x}\right)^2}.$

(ii) $-\dfrac{1}{(x+2)(x+4)} + \dfrac{1}{(x+1)(x+3)} - \dfrac{3}{(x+1)(x+2)(x+3)(x+4)}.$

5. Arrange the expression

$(b+c)^2(a+d)^2 - 4(ab+cd)(ac+bd)$,

according to powers of b, and hence find its square root.

6. Shew that the two expressions $(a^2 - a + 1)(b-c) + (b^2 - b + 1)$

$(c-a) + (c^2 - c + 1)(a-b)^2$ and $(a^2 - a + 1)(b^2 - c^2) +$

$(b^2 - b + 1)(c^2 - a^2) + (c^2 - c + 1)(a^2 - b^2)$ are equal.

7. Prove the rule for finding the greatest common measure of two algebraical expressions.

Shew that $\dfrac{2x^3 + 5x^2 + 19}{x^3 + 5x + 12}$ is in its lowest terms.

8. If $\dfrac{a-1}{x} - \dfrac{a-2}{y} = \dfrac{1}{b}$ and $\dfrac{b-1}{x} - \dfrac{b-2}{y} = \dfrac{1}{a}$;

shew that $\dfrac{c-1}{x} - \dfrac{c-2}{y} = \dfrac{c}{ab}.$

9. Solve the equations:—

(1) $\dfrac{12x+19}{18} - \dfrac{7x-2}{3x-10} = \dfrac{8x-25}{12} + \dfrac{5}{36}.$

(2) $a\sqrt{\dfrac{1+x}{1-x}} + (a+2)\sqrt{\dfrac{1-x}{1+x}} = 2\sqrt{a(a-2)}.$

(3) $x+y+z = (a-b)(b-c)(a-c)$

$ax+by+cz = 0$

$a^2x+b^2y+c^2z = 0.$

10. A horseman travelling at a walking pace of 4 miles an hour meets a bandy going in the opposite direction at the rate of 2 miles an hour ; after proceeding at the same pace for half an hour he turns and canters back till he overtakes the bandy. If he had continued for another quarter of an hour before turning, the bandy would have been $\frac{7}{8}$ths of a mile further on before it was overtaken. Find the rate at which the horseman cantered.

XIII—(1871.)

1. If $x = \dfrac{b^2+c^2-a^2}{2bc}$, $y = \dfrac{a^2+c^2-b^2}{2ac}$ and $z = \dfrac{a^2+b^2-c^2}{2ab}$.

find in the simplest forms the values of :—

(i) $(b+c)x + (c+a)y + (a+b)z.$

(ii) $\dfrac{x+yz}{y+xz}.$

2. Reduce to their simplest forms :—

(i) $\dfrac{x^4-(x-1)^2}{(x^2+1)^2-x^2} + \dfrac{x^2-(x^2-1)^2}{x^2(x+1)^2-1}, \dfrac{x^2(x-1)^2-1}{x^4-(x+1)^2}$.

(ii) $\dfrac{x-1}{x^2+x+1} + \dfrac{x+1}{x^2-x+1} - \dfrac{2x(x^2-2)}{x^6-1}.$

(iii) $\dfrac{1 + \dfrac{a-bx}{c+bx}}{x+2(a+c)} \cdot \dfrac{1 + \dfrac{x}{a+c-x}}{} - \dfrac{1 + \dfrac{a-bx}{c+bx}}{x-2(a+c)} \cdot \dfrac{1 + \dfrac{x}{a+c-x}}{}$

3. If a quantity measure two other quantities, prove that it will also measure the sum or difference of any multiples of these two quantities.

If the two expressions $ax^3 - c(3a+b)x^2 + (a^3 + bc^2)x + d$ and $bx^3 + c(a-b)x^2 + a(c^2 - a^2x) - d$ have a common quadratic factor, (that is, a factor containing x^2 as the highest power of x), prove that this factor is an exact square.

4. Find the square root of

$$A^2 - 2 + \frac{4x^3 + 9x^2 + 4x + 9}{x^4 + 4x^3 + 5x^2 + 4x + 4}.$$

5. There are two quantities, a, b, of which the L. C. M. is x, and the G. C. M. is y;

if $x + y = ma + \cdot \frac{b}{m}$.

prove that $x^3 + y^3 = m^3 a^3 + \frac{b^3}{m^3}$.

6. Find the G. C. M. of

$x^8 + 36x^3 - 4x^2 + 8x - 17$ and $x^6 + 8x^3 - x^2 + 2x - 4$.

7. If $ab + ac + bc = 1$, prove that

$$\left\{ 1 - \frac{a^2}{1+a^2} - \frac{b^2}{1+b^2} - \frac{c^2}{1+c^2} \right\}^2 = \frac{4a^2b^2c^2}{(1+a^2)(1+b^2)(1+c^2)}$$

8. Solve the following equations :—

(i) $\dfrac{10x+47}{18} - \dfrac{12x+38}{3x+23} = \dfrac{5x+11}{9}$.

(ii) $(a+b)x-(a-b)y = \dfrac{3a+7b}{21}(x^2-y^2)$

$(a-b)x+(a+b)y = \dfrac{3a+7b}{21}(x^2-y^2).$

(iii) $\dfrac{x+2y+1}{2} = \dfrac{y+3z+2}{3} = \dfrac{z+4x+3}{4} = 2.$

9. A and B play four games of chance, of which A wins the first and last, and B the other two. The amount which each stakes for the first game is half the whole sum of money possessed by both together, and for the other games half the money possessed by the loser of the preceding game. At the end of the fourth game, A finds that he has 18 shillings less than he would have had if he had won them all, and B finds that he has 9 shillings less than he had at starting. Find the amount of money possessed by each at first.

XIV—(1873.)

1. Divide $a(a+b)(a+c) - b(b+c)(b+a)$ by $(a-b)$ and by $(a+b+c)$.

2. Assuming that x^n-y^n is divisible by $x-y$, when n is any whole number, show that $(ab)^n - (bc)^n + (cd)^n - (da)^n$ is always divisible by $ab-bc+cd-da$.

3. Prove that any Common Multiple of a and b is a Multiple of their Least Common Multiple.

4. Find the G. C. M. of a^5+2a^2+4 and $a^5-3a^4+2a^3-4$.

5. Simplify:—

(i) $\dfrac{(n+2)^2(n+1)^2-(n-1)^2(n-2)^2}{(n+1)^3+n^3+(n-1)^3}.$

(ii) $\dfrac{1}{(x+1)(2x+1)} + \dfrac{1}{(2x+1)(3x+1)} + \dfrac{1}{(3x+1)(4x+1)} + \dfrac{1}{(4x+1)(5x+1)}.$

6. Show that $(a-b)^2(c+d)^2 + 4ab(c^2+d^2) - 4cd(a^2+b^2)$ is an exact square.

7. Prove that $\dfrac{(a+b)^3 - (b+c)^3 + (c+d)^3 - (d+a)^3}{(a+b)^2 - (b+c)^2 + (c+d)^2 - (d+a)^2} = \frac{3}{2}(a+b+c+d)$.

8. Show that $\dfrac{ab}{(x-a)(x-b)} + \dfrac{bc}{(x-b)(x-c)} + \dfrac{c}{(x-c)(x-a)} = 0$,

   when $\dfrac{1}{x} = \dfrac{1}{3}\left(\dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c}\right)$.

9. Solve the equations:—

   (i) $\dfrac{3}{x-3} - \dfrac{4}{x+9} - \dfrac{5}{x-27} + \dfrac{6}{x-15} = 0.$

   (ii) $\sqrt{a-m^2x} - \sqrt{b-n^2x} = \sqrt{(a+b)-(m+n)^2x}.$

   (iii) $\dfrac{a}{x} + \dfrac{b}{y} = \dfrac{a}{y} + \dfrac{b}{z} = \dfrac{a}{z} + \dfrac{b}{x} = c.$

10 A gentleman went out for a walk; and after having been out 12 minutes, was overtaken by his servant who had run from the house at thrice his master's pace The master then bade the servant run back at the same rate to the house and bring his cigars, while he walked on at his former pace. If the master was one mile from the house when overtaken the second time, at what rate did he walk?

XV—(1874.)

1. Divide $\dfrac{a^3}{b^3} + \dfrac{b^3}{c^3} + \dfrac{c^3}{a^3} - 3$ by $\dfrac{a}{b} + \dfrac{b}{c} + \dfrac{c}{a}.$

2. Write out the first five terms of the quotient of

   $\dfrac{a^{2n+1} + b^{2n+1}}{a+b}$ and $\dfrac{a^{2n+1} - b^{2n+1}}{a-b}$; and hence, find without

   multiplication the product of

   $(a^4 + a^3 + a^2 + a + 1) \times (a^4 - a^3 + a^2 - a + 1).$

3. From $(x + a - b)(x + b - c)(x + c - a)$ subtract $(x - a + b)$ $(x - b + c)(x - c + a)$ and divide the remainder by $(a - b)$ $(b - c)(c - a)$.

4. Prove that every Common Measure of two Algebraical Expressions will divide their G. C. M.

Find the G. C. M. of $a^5 + 29a - 15$ and $2a^5 - 3a^4 + 16a^2 + a - 10$.

5. Simplify :—

(i) $\dfrac{a^2}{x(a - x)} + \dfrac{x^2}{a(x - a)} + \dfrac{(a - x)^2}{ax}$.

(ii) $\dfrac{(ac + bd)^3 - (ad + bc)^3}{(a - b)(c - d)} - \dfrac{(ac + bd)^3 + (ad + bc)^3}{(a + b)(c + d)}$.

6. Given that $s = a + b + c$: Prove that $(s - 3a)^2 + (s - 3b)^2 + (s - 3c)^2 = 3\{(a - b)^2 + (b - c)^2 + (c - a)^2\}$.

7. Extract the square root of

$(a^2 + b^2)(a^2 b^2 + 1) - 2ab(a^2 - 1)(b^2 - 1) - 4a^2 b^2$.

8. If $x = \dfrac{a + 1}{a - 1}$, $y = \dfrac{b + 1}{b - 1}$, $z = \dfrac{c + 1}{c - 1}$.

shew that $\dfrac{(x^2 + 1)(y^2 + 1)(z^2 + 1)}{(xy + 1)(yz + 1)(zx + 1)} = \dfrac{(a^2 + 1)(b^2 + 1)(c^2 + 1)}{(ab + 1)(bc + 1)(ca + 1)}$.

9. Solve the following equations :—

(i) $\dfrac{x - 4}{(x - 1)(x - 3)} + \dfrac{x - 7}{(x - 1)(x - 6)} + \dfrac{x - 9}{(x - 3)(x - 6)} = \dfrac{3}{x}$

(ii) $\sqrt{15 - 9x} + \sqrt{10 - 4x} = \sqrt{5 - x}$.

(iii) $4ax + (a + 1)y = (3a - 1)z$,

$(3a - 1)(x - y - 1) + z = 0$, $x + y = z$.

D

10. A man rowing against a stream meets a log of wood which is being carried down by the current. He continues rowing in the same direction for a quarter of an hour longer and then turns and rows down the stream, overtaking the log $1\frac{1}{2}$ miles lower down, than the point where he first met it. Find the rate at which the current flows

XVI—(1875.)

1. Remove from brackets $(c-a-b)-\{(b+c--a)-(a-b-c)-(c+a-b)\}$.

2. If $x=\dfrac{a-b}{m-c}$, $y=\dfrac{b-c}{m-a}$, $z=\dfrac{c-a}{m-b}$, find the value of $x+y+z+xyz$.

3. Add together the squares of
$2\{\sqrt{ab(1+a)(1+b)}+\sqrt{ab(1-a)(1-b)}\}$, and of
$\{(a+\sqrt{1-a^2})(b-\sqrt{1-b^2})-(b-\sqrt{1-a^2})(a+\sqrt{1-b^2})\}$.
and simplify the result.

4. What must be the form of m in order that a^m-x^m may have both a^n+x^n and a^n-x^n for division, n being any positive integer?

   Shew that $2^{4n}-1$ is divisible by 15.

5. Reduce to its lowest terms
$$\frac{20a^5+10a^3+24}{24a^5+10a^2+20}.$$

6. State and prove the rule for finding the Least Common Multiple of the two Algebraical Expressions P and Q.

   Find the L. C. M. of $1+a+a^5$ and $1+a^4+a^5$.

7.. Simplify :—

(i) $\dfrac{\sqrt{ax}}{\sqrt{a}+\sqrt{x}-\sqrt{a+x}}$ $\qquad$ $\dfrac{\sqrt{ax}}{\sqrt{a}+\sqrt{x}+\sqrt{a+x}}$

ii) $\dfrac{a+b+c}{a+b-c}+\dfrac{c+a-b}{b+c-a}$ $\qquad$ $\dfrac{a+b+c}{a+b-}$

$\dfrac{a+b-c}{c+a-b}+\dfrac{b+c-a}{a+b+c}$ $\qquad$ $\dfrac{b+c-a}{c+a-b}$

8. Find what term is wanting to make the following expression a complete square

$(a^2x^4+64b^2)-4(ac^2+8b)(a-b)\,v.$

9 Solve·—

(i) $\dfrac{x-7}{x-3}+\dfrac{x-2}{c-9}+\dfrac{c-4}{x-1}=3.$

(ii) $\sqrt{\dfrac{x-a}{x-b}}+\dfrac{a}{x}=\sqrt{\dfrac{c-b}{x-a}}+\dfrac{b}{x}.$

(iii) $(a^2+b^2)(x-1)=ab(2x-y)$; $4x=y+2.$

10. A person sets out to walk to a certain town But when he has accomplished a quarter of his journey, he finds that if he continues at the same pace, he will have gone only $\frac{5}{8}$ths of the whole distance when he ought to be at his destination. He therefore increases his speed by a mile an hour and arrives just in time. Find his rates of walking

XVII—(1877.)

1. Resolve into factors

$(2a+2b-ab)^2-(b^2-4a)(a^2-4b).$

2. Simplify :—

$$\frac{a+b}{2ab}\,(a^2+b^2-c^2) \;+\; \frac{b+c}{2bc}(b^2+c^2-a^2)+\frac{c+a}{2ca}$$

$$(c^2+a^2-b^2),\text{ and shew that if } a+b+c=0,\;\frac{a^2+b^2+c^2}{a^3+b^3+c^3}$$

$$+\;\frac{2}{3}\Big(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\Big)=0.$$

3. Find the G. C. M. of $x^4-39x-22$ and $11x^4-39x^3-8$,
   and the square root of

$$(x^3+4)(x-1)+\Big(\frac{x}{2}+\frac{2}{x}\Big)^2.$$

4. Solve $\dfrac{(x+1)^5+(x-1)^5}{(x+1)^3+(x-1)^3}=10.$

5. A person being asked his age replied —" Ten years ago I was
   five times as old as my son, but twenty years hence I shall
   be only twice as old as he ".   What is his age ?

XVIII—(1878.)

1. Simplify $\dfrac{x^3+3x^2+5x+15}{x^3+2x^2+5x+10}+\dfrac{x^4+x^3+3x^2+x-2}{x^4+2x^3+3x^2+4x-4}.$

2. Show that $(x^3-3x)^4-8(x^6-6x^4+9x^2-2)$ is an exact square
   and resolve the whole expression into factors.

3. Show that (i) if $a+b+c=0$, then $a(b-c)^3+b(c-a)^3+c$
   $(a-b)^3=0$; (ii) if $a+b+c=1$, $ab+bc+ac=\frac{1}{3}$, $abc=\frac{1}{27}$ then

$$\frac{1}{a+bc}+\frac{1}{b+ac}+\frac{1}{c+ab}=\frac{27}{4}.$$

1. Solve the following equations :—

(1) $\dfrac{4(x+5)}{x+6} + \dfrac{3(x+6)}{x+5} = 7.$

(2) $x + y + z = ax + by + cz = 0$

$\dfrac{x}{b-c} + \dfrac{y}{a-c} + \dfrac{z}{a-b} = 1.$

5. A mail coach runs between two places A and B, and back again. A traveller who starts walking from A 5 hours before the mail coach is overtaken by it half way between A and B. He then doubles his rate of walking and meets the mail coach on its return journey 3 miles form B. The traveller then goes to B at the same rate and returns, and by the time he comes again midway between A and B, the mail coach reached A. Find the distance between A and B and the rate at which the mail coach runs.

MATRICULATION EXAMINATION PAPERS.

— ◆ —

ALGEBRA.

(I.—1862.)

1 Define the *power* of a number, and the *index* of the power; and illustrate the distinction between them by any numerical example.

Find the value of a^0.

2. Define a *simple quantity*, and a *compound quantity*. Is $42abx^2$ a simple or a compound quantity? Give the *names* of the different kinds of compound quantities, illustrated by *algebraical examples*.

3. Multiply $x^2 - \frac{1}{2}x + \frac{2}{3}$ by $\frac{1}{3}x + 2$.

Divide (1) $x^4 + 6x^3 - 5$ by $x^2 + 3$. (2) $\dfrac{a+b}{a+c}$ by $\dfrac{a-c}{a-b}$.

. (3) $1 - \dfrac{y^4}{y^2 + a^2}$ by $1 + \dfrac{a^2}{y^2 + a^2}$.

4 The epitaph of Diophantus states that he passed the sixth part of his life in childhood, and the twelfth part of it in the state of youth, and that after an interval of five years more than the seventh part of his life he had a son who died when he had attained to half the age of his father, and that the father survived the son four years. How long did Diophantus live?

5. To the sum of $\dfrac{x}{y}$ and $\dfrac{y}{x}$ annex ± 2 and multiply the result by xy, putting the product in its simplest form.

6. Find two numbers, the greater of which shall be to the less as their sum is to 42, and as their difference to 6.

7. Reduce $\dfrac{a^4-8a^2+a-6}{a^3+6a^2+10a+3}$ to its lowest terms.

8. Resolve into elementary factors.

(1) $25a^2x^2-4y^2$, (2) x^3+y^3, (3) x^3-y^3.

9. Find (a) the instant of time between 3 and 4 o'clock at which the hour-hand and the minute hand are exactly in *the same direction*, and (b) that at which they are exactly *opposite* each other.

10. Solve the following simultaneous equations :—

$4x-5y+6z = 3,\ 8x+7y-3z = 2,\ 7x+8y+9z = 1.$

II—(1863.)

1. Explain the following :—*like quantities, an expression of n dimensions, a coefficient, a root of any quantity.*

If $a = 4$ and $x = 2$, find the numerical value of

$$\frac{2a.c^2}{(a-x)^2} - \frac{6\sqrt[3]{ax}}{a^3\sqrt{2a+4x}} - \frac{29x^2}{64a}.$$

2. State the rule for the addition of Algebraical quantities.

Add together $\dfrac{x}{a} + \dfrac{y}{b} + c,\ -\dfrac{yz}{a}\ -\dfrac{xz}{b}\ \dfrac{xy}{a}, a.x + by$

$$\frac{1}{c}$$

3. Divide $a^2x^2-b^2x^2+a^2bx- qb^2x+a^3-a^2b+ab^2-b^3$ by $ax^2+bx^2+abx+a^2+b^2.$

4. Investigate a rule for finding the H. C. M. of two Algebraical expressions.

Find the L. C. M. of a^2-1, a^3-1 and a^2+5a+4.

5 Define a Fraction. Reduce to their simplest forms

$$\left(\frac{a^2}{x}-\frac{x^3}{a^2}\right)\div\left(\frac{a}{x}+\frac{x}{a}\right), \; \frac{x+\sqrt{x^2-1}}{x-\sqrt{x^2-1}}-\frac{x-\sqrt{x^2-1}}{x+\sqrt{x^2-1}}.$$

6 Show that the sum of any fraction and its reciprocal is always grater than 2.

7. Interpret the meaning of the equation $\dfrac{a^m}{n}$ of m and n being equal.

Extract the square root of—

$$a^3-2a^{\frac{3}{2}}b^{\frac{3}{2}}+2a^{\frac{3}{2}}c^{\frac{3}{2}}-2b^{\frac{3}{2}}c^{\frac{3}{2}}+b^{\frac{4}{3}}+c^3.$$

8. Solve the following Equations :—

(a) $6-\dfrac{x-1}{2}-\dfrac{x-2}{3}=\dfrac{3-x}{4}$.

(b) $\dfrac{5}{x}+\dfrac{4}{y}=58$, $\dfrac{3}{x}+\dfrac{7}{y}=67$.

(c) $\dfrac{\sqrt{x+1}-\sqrt{x-1}}{\sqrt{x+1}+\sqrt{x-1}}=\dfrac{1}{2}$.

9. A vessel can be filled by means of one tap in 3 hours and by means of a second tap in 5 hours, in what time will it be filled if both taps run together?

10. A ship left Bombay on a voyage of 3 weeks, with provisions for that time at the rate of a seer a day for each man. At the end of a week a storm arose which washed 4 men overboard and so damaged the vessel that its speed was reduced by half, and each man could be allowed only $\frac{3}{4}$ of a seer per diem. What was the original number of the crew?

III—(1864.)

1. In what respect are the sciences of Arithmetic and Algebra identical, and in what respect do they differ ?

   Explain the following :— *Simple quantities, Similar quantities, Irrational quantities.*

2. If $a = 1$, $b = 2$, $c = 3$, $d = 4$, find the numerical value of the expression,

   $$\frac{ab}{bc} - \frac{bc}{cd} + \frac{ac}{cd} - \frac{cd}{da} + \frac{ad}{da} - \frac{da}{ab} .$$

3. From $(a + b)x + (b + c) y$ take $(a - b)x - (b - c)y$.

4. What is the value of $a \times 0$?

   Multiply $a^4 + a^3 b + a^2 b^2 + ab^3 + b^4$ by $(a - b)$.

5. Find the G. C. M. of $a^4 - x^4$ and $a^3 - a^2 x - ax^2 + x^3$.

6. Prove that the value of a fraction is not altered by multiplying its numerator and denominator by the same quantity.

   Reduce to their simplest forms:—

   (i) $\dfrac{a - b}{bc} - \dfrac{a - c}{ac} + \dfrac{b - c}{bc} .$

   (ii) $\dfrac{a}{b} - \dfrac{(a^2 - b^2)x}{b^2} + \dfrac{a(a^2 - b^2)x^2}{b^3 (b + ax)} .$

7. If $x + \dfrac{1}{x} = p$, prove that $x^3 + \dfrac{1}{x^3} = p^3 - 3p$.

8. Solve (1) $\dfrac{\sqrt{x + 2}}{\sqrt{x - 2}} = \dfrac{3}{2}$. (2) $\dfrac{m}{x} + \dfrac{n}{y} = a$, $\dfrac{n}{x} + \dfrac{m}{y} = b$.

9. Find a number such that whether divided into two equal parts or into three equal parts, the product of the parts shall be the same.

10. A labourer is engaged for 10 days, on condition that he shall receive 8 annas for every day's work done, and that he shall pay 1 anna for every day on which he is absent from work— at the end of the 10 days he receives 8 annas ; on how many days did he work, and on how many days was he absent ?

IV—(1865.)

1. Define the terms *a Homogeneous Expression, similar Quantities.*

   Remove the brackets from the expression
   $$a-[2b+\{3c-3a-(a+b)\}+2a-(b-3c)].$$

2. If $x=2$, $y=3$, $a=6$, $b=5$, find the values of

   (i) $\sqrt[3]{b(x+y)^2} + \sqrt[3]{(x+a)(b-2x)} + \sqrt[3]{x(b-y)^2_-}$.

   (ii) $x+2a-\{y+b-[x-a-(y-2b)_-]\}$.

3. State the rule for the multiplication of two algebraical quantities.

   · Multiply together $(a^2-3a+2)^2$ and a^2+6a+1.

4. Assuming the rule for finding the G. C. M. of two algebraical quantities, prove that for finding the G. C. M of three such quantities. Find by inspection the G. C. M. of .— $(x-1)^2(x-2)(x-3)$ and $(x-1)^3(x-4)(x-5)$.

5. Simplify the expression

   $$\overline{a(a-b)(a-c)} + \overline{b(b-c)(b-a)} + \frac{1}{c(c-b)(c-b)}.$$

   And multiply $\frac{x}{a^2}- \frac{x}{a} +1$ by $\frac{x}{a^2} + \frac{x}{a} + 1$.

6. Extract to three terms the square root of $(1 + x)$.

7. Divide $a^{\frac{5}{2}} - a^{\frac{3}{2}}b + ab^{\frac{9}{2}} - 2a^{\frac{1}{2}}b^2 + b^{\frac{5}{2}}$ by $a^{\frac{3}{2}} - ab^{\frac{1}{2}} + a^{\frac{1}{2}}b - b^{\frac{3}{2}}$

Show that $\dfrac{a\sqrt{a + x}}{\sqrt{a + x} - \sqrt{}} = a + x + \sqrt{ax + x^2}$

8. Solve (i) $\dfrac{2x - 3}{3x - 4} = \dfrac{4x - 5}{6x - 7}$. (ii) $\sqrt{x + 18} + \sqrt{x} = 12$.

(iii) $\sqrt[m]{a + x} = \sqrt[2m]{x^2 + 8ax + b^2}$.

9. A cistern can be filled by two pipes, A and B, in 12 hours. and by the pipe A alone in 20 hours; required the time in which it would be filled by B alone.

10. A privateer sailing at the rate of 10 miles an hour discovers a ship 18 miles off running from her at the rate of 8 miles an hour, how many miles can the ship run before being overtaken?

V—(1866.)

1. If $a = 16$, $b = 10$, $x = 5$, $y = 1$, find the numerical value of
$(a - y)\{\sqrt{(2bx) + x^2} + \sqrt{(a - x)(b + y)}\}$

2. If the multiplicand and the multiplier of any expression be both homogeneous, what will be the character of the product?

3. Divide $6a^4 - a^3b + 2a^2b^2 + 13ab^3 + 4b^4$ by $2a^2 - 3ab + 4b^2$.

4. Prove that
$\{(a - b)^2 + (b - c)^2 + (c - a)^2\} = 2\{(a - b)^4 + (b - c)^4 + (c - a)^4\}$.

5. Find the G. C. M of $4x^4 + 9x^3 + 2x^2 - 2x - 4$ and $3x^3 + 5x^2 - x + 2$.

6. What is a complex fraction? How do you simplify it?

   Simplify

   $$x + \cfrac{1}{1 + \cfrac{}{x + 1}}$$

7. Extract the square roots of:—

   (i) $4x^4 - 4x^3 + 5x^2 - 2x + 1$.

   (ii) $x^4 - x^3 + \dfrac{x^2}{4} - 4x - 2 + \dfrac{4}{x^2}$.

8. Show that $a^0 = 1$, $a^{-1} = \dfrac{1}{a}$, and $\left(a^{\frac{3}{2}}\right)^{\frac{1}{2}} = (a)^{\frac{3}{4}}$.

9. Solve   (i) $\dfrac{2x-3}{3x-4} = \dfrac{4x-5}{6x-7}$.   (ii) $\dfrac{3x-5y}{2} + 3 = \dfrac{2x+4}{5}$,

   8    $\dfrac{x-2y}{4} = \dfrac{x}{2} + \dfrac{y}{3}$.

10. A pound of tea and three pounds of sugar cost six shillings, but if sugar were to rise 50 per cent., and tea 10 per cent., they would cost seven shillings. Find the price of tea and sugar.

11. A Railway train after travelling for one hour meets with an accident, which delays it one hour, after which it proceeds at $\frac{2}{3}$ths of its former rate, and arrives at the terminus three hours behind time, had the accident happened 50 miles further on, the train would have arrived 1 hour 20 minutes sooner, Required the length of the time,

VI—(1867.)

1. If $a = 3$, $b = -2$, $c = 1$ find the value of

    (i) $\dfrac{a^2 + b^2 + c^2}{a + b + c} - \dfrac{a^2 - b^2 - c^2}{a - b - c}$.

    (ii) $a(a - b)(a - c)\{ \sqrt{2a^2 + 3b + 4c} - \sqrt{a + c}. \sqrt{a + c}\}$

2. Multiply $x^2 - xy^{\frac{1}{2}} + x^{\frac{1}{2}}y - y^{\frac{3}{2}}$ by $x^{\frac{1}{2}} - y^{\frac{1}{2}}$.

3. Extract the square root of :—

$$x^6 - 2x^4y^2 + 2x^3y^3 + x^2y^4 - 2xy^5 + y^6.$$

4. Shew that $\dfrac{x + y}{\sqrt{x + y} - y} = \dfrac{\sqrt{x^3 + x^2 y - xy^2 - y^3}}{\sqrt{x^2 - y^2} - y \sqrt{x - y}}$.

5. Reduce (i) $\dfrac{3}{4(x^2 - y^2)} + \dfrac{3}{x - y} - \dfrac{4}{x + y}$.

    (ii) $\dfrac{1}{x + \dfrac{1}{1 + \dfrac{x + 3}{2 - x}}}$.

6. Divide $x^{2-a-b} \times x^{b-\frac{3}{2}}$ by $x^{-(a-\frac{1}{2})}$ representing the result in its simplest form.

7. Add together $\dfrac{1}{a + b}$, $\dfrac{1}{a - b}$, and $\dfrac{2b}{a^2 - b^2}$.

8. Solve (i) $\sqrt{x + 12} + \sqrt{x} = 6$. (ii) $\dfrac{2x - 3}{5x - 2} = \dfrac{2x + 6}{5x + 37}$.

    (iii) $\dfrac{5}{y} + \dfrac{2}{x} = \dfrac{5}{6}$, $\dfrac{4}{y} + \dfrac{3}{x} = \dfrac{9}{10}$.

E

9. Find the exact time after 3 o'clock that the hour and minute hands are 1st exactly. in the same direction, and 2ndly at right angles to each other.

10. A merchant has a certain number of Back Bay and Mazagon Shares. The market rate for the two shares was Rs. 2,000 but Mazagon Shares rose 10 per cent. and Back Bays fell 20 per cent. The value of the two shares became in consequence $12\frac{1}{2}$ per cent. less than before. Find the original market value of each share.

11. Two boats start at the same time from Bassein and Tanna, the distance between which is 18 miles. At a distance of one mile from Tanna the Callian creek falls into the Tanna creek, causing a current at the rate of $2\frac{1}{2}$ miles an hour towards Tanna, and two miles an hour towards Bassein. The boat from Tanna is rowed at the rate of $3\frac{1}{3}$ miles per hour, and the Bassein boat at 3 miles per hour. Where will they meet ?

VII—(1868.)

1. Define a *term*, and an *expression*.
    What is meant by the *dimension* or the *degree* of a term?
    Write down two trinomial homogeneous expressions, one of six dimensions, and the other of seven dimensions.

2. Reduce to its simplest form
    $$\{2x^3 - (y^3 - xy)\} - \{y^2 - (4x^2 - y^2)\} + \{2y^2 - (3xy - x^2)\}.$$

3. Divide $a^5 - 2a^4b + 2a^3b^2 - 4a^2b^3 - 8ab^4 + 16b^5$ by $a^2 - 2b^2$.

4. Resolve $a^2 - 4b^2 - c^2 + 9d^2 - 2(3ad - 2bc)$ into factors.

5. Find the G. C. M. of $4a^6x + 6a^4x^2 - 18a^5x^3$ and $12a^5x^2 - 24a^4x^3 + 28a^3x^4 - 6a^2x^5$.

6. Find the value of

$$\left(\frac{a+b}{a-b} - \frac{a-b}{a+b} - \frac{2a^2}{a^2-b^2}\right) \cdot \frac{a-b}{2a}.$$

7 Extract the square root of

$$x^6 - 4x^5y + 4x^4y^2 - 2x^3y^2 + 4x^2y^3 + y^4.$$

8. Solve (i) $\dfrac{4x-9}{27} - \dfrac{x-3}{4} = \dfrac{5x-3}{6} - \dfrac{x+6}{2}$.

(ii) $\dfrac{75-x}{3(x+1)} + \dfrac{80x+21}{5(3x+2)} = \dfrac{23}{x+1} 5.$

9. The charge for the first class tickets of admission to an ex-
hibition was Rs. 4 each, and the charge for second class
tickets was Rs. 2 8as. The whole number of tickets sold
was 259, and the total amount received for them was
Rs 731 8 as   How many first class tickets were sold,
and how many second class tickets ?

VIII—(1869.)

1. If $a = 2$, $b = 3$, $c = 4$, $d = 5$, find the value of

$$\frac{ab^2c + (a^2d - b^3)c - bd^3}{(bc^2 - ad^2)^3}.$$

2. Define a *power* of a quantity, and the *index* of the power.
Interpret a^{-m} and $a^{\frac{m}{n}}$.

3. Multiply $a^{(m-1)/n} - b^{(n-1)/m}$ by $a^n - b^m$.

4. Find the L. C. M. of $2x^4 + 2x^3y - 18x^2y^2 + 22xy^3 - 8y^4$
and $3x^4 - 3x^3y - 9x^2y^2 + 15xy^3 - 6y^4$.

5. Reduce $\left(\dfrac{x^2}{yz} + \dfrac{x}{z} - \dfrac{x+z}{w}\right) \div \left(\dfrac{x}{y} - \dfrac{z}{w}\right).$

6. If $s = \dfrac{a+b+c}{2}$ prove that $s(s-a)(s-b) + s(s-b)(s-c) +$

    $s(s-c)(s-a) = (s-a)(s-b)(s-c) + abc.$

7. Extract the square root of :—

    $x^{} \cdots 6x^{\frac{5}{6}}y^{\frac{1}{3}} + 9x^{\frac{2}{3}}y^{\frac{2}{3}} - 4c^{\frac{1}{3}}y^{\frac{1}{3}} - 12x^{\frac{1}{3}}y^{\frac{5}{6}} + 4y.$

8. Solve (i) $\dfrac{3x+1}{29}$ $\dfrac{402+x}{12}$ 99 $\dfrac{371-6x}{2}.$

      (ii) $\dfrac{10x+4}{21} + \dfrac{7-2x^2}{14(x-1)}$ $\dfrac{11-5x}{15} + \dfrac{4x-3\frac{2}{5}}{6}$

      (iii) $\begin{cases} 10x - \dfrac{4y+3}{4} = 7 + \dfrac{12y-10x}{5} \\ 16y + \dfrac{5x-z}{3} = 26\frac{1}{2} \quad \dfrac{8y+1}{2}. \end{cases}$

9. A garrison of 1500 men was victualled for 36 days ; but after 16 days it was reinforced, and the provisions were then exhausted in 12 days. Required the number of men in the reinforcement.

10. A person left Poona in the Sattara mail buggy at 2 P. M. and having proceeded a certain distance he got out of the buggy and returned to Poona on foot, walking at the rate of 3 miles an hour, and he reached Poona at 8 P. M. Had he gone 6 miles further in the buggy he would not have got back to Poona till 10 hours 40 minutes P. M. How far did he go towards Sattara, and what was the speed of the buggy ?

IX—(1872.)

1. Explain the terms — *index*, *coefficient*, *like* and *unlike* quantities.

2. If $a = \sqrt{2}$, $b = \sqrt{3}$, $c = 4$, $d = 0$, find the value of

$$\sqrt{(a^2 + b^2 + c^2)(b^2 + c^2)(b^2 + d^2)}.$$

3. Divide $a^{2n+1} - a^{n+1} - a^n + a^{n-1}$ by a^{n-1}

4. Simplify (i) $\dfrac{(x-1)^2}{y3} \cdot \dfrac{(x+1)y^2}{x-1}$

   (ii) $\dfrac{a}{(1-a)^4} - \dfrac{a^2}{(1-a)^3} + \dfrac{1}{(1-a)}.$

5. Find the G. C. M of $x^3 + 2x^2 + 2c + 1$ and $x^5 - 2c - 1$, and the L. C. M of $6(x^2 + xy)$, $8(xy - y^2)$ and $10(x^2 - y^2)$.

6. Extract the square root of—

   $$4x^4 + 12x^3y + 13x^2y^2 + 6xy^3 + y^4.$$

7 Solve (i) $\frac{1}{3}(x+1) + \frac{1}{4}(x+3) = \frac{1}{3}(x+4) + 16$

   (ii) $\dfrac{x+1}{2} + 3y = 33$, $\dfrac{y+6}{3} + 2x = 27.$

8. The sum of two numbers is 100 and the greater is to the less as $7 : 3$; what are the numbers?

9 There is a number consisting of two digits whose sum is 10, and if 72 be subtracted from it, the digits will be inverted. What is the number?

X.—(1873.)

1. Explain the terms *Binomial, Exponent, Rational* and *Irrational Quantities*.

2. Find the value of the following expressions :—

   (i) $\dfrac{x^4 - y^4}{a^2b + ab^2} \times \dfrac{a+b}{(x+y)^2} \qquad \dfrac{(x-y)^3}{ab}.$

   (ii) $\dfrac{3x+2}{x-1} \qquad \dfrac{x-1}{4x+1} + 2x.$

3. Find the G. C. M. of $12a^2x^4 + 120a^4x^2 - 132a^5x$,

and $3x^8a^2 - 27x^7a^3 + 39x^6a^4 - 15x^3a^7$; and the L. C. M. of $7(x-a)$, $14(x^2-a^2)$, and $21(x^3-a^3)$.

4. Find the square root of $x^3 - 4x^5 + 10x^4 - 20x^3 + 25x^2 - 24x + 16$, and the cube root of $8x^3 + 60x^2y + 150xy^2 + 125y^3$.

5. Solve the equations :—

$$
\begin{cases}
\dfrac{4x^2 + 2xy + 288 - 6y^2}{2x + 13 - 2y} = 2x + 3y - 131, \\
5x - 4y = 22.
\end{cases}
$$

6. B has 8 miles start of A, but only travels at the rate of 3 miles per hour while A travels at the rate of $4\tfrac{1}{2}$ miles per hour. Where will A overtake B, and how long will he take to do it ?

7. A mixture is made up of a gallons at m rupees per gallon, b gallons at n rupees and c gallons at p rupees per gallon : what will be the value of the mixture ?

8. Solve the equations :—

$$
\begin{cases}
\dfrac{2}{x} - \dfrac{3}{y} + \dfrac{4}{z} = -\dfrac{33}{10} \\
\dfrac{1}{x} + \dfrac{1}{y} - \dfrac{1}{z} = -\dfrac{37}{60} \\
\dfrac{5}{x} - \dfrac{2}{y} + \dfrac{3}{z} = -\dfrac{191}{60}
\end{cases}
$$

9. The sum of the three digits of which a number consists is 9 ; the first digit is one-eighth of the number consisting of the last two ; and the last digit is likewise one-eighth of the number consisting of the first two. Find the number.

XI—(1874.)

1. Describe in words the operations indicated by the expression :—

$$\sqrt{\frac{(a^3 + b^3) c^2}{(a^2 - b^2)^3}}.$$

2. Multiply $\quad a^{\frac{3}{4}} + a^{\frac{1}{2}}b^{\frac{1}{4}} + a^{\frac{1}{4}}b + b^{\frac{3}{4}}$ by $a^{\frac{1}{4}} - b^{\frac{1}{4}}$.

   Divide $\quad x^{\frac{7}{6}} - 2x^{\frac{5}{6}} + x^{\frac{1}{2}}$ by $x^{\frac{2}{3}} - 2x^{\frac{1}{2}} + x^{\frac{1}{3}}$.

3. Find the G. C. M. of $\quad \dfrac{3a^3 - 3a^2b + ab^2 - b^3}{4a^2 - ab - 3b^2}$ and reduce

   the fraction to its lowest terms.

   Find the L. C. M. of $a^3 + x^3$ and $a^2 - x^2$.

4. Divide $\quad \dfrac{a}{1+a} + \dfrac{1-a}{a} \quad$ by $\quad \dfrac{a}{1+a} - \dfrac{1-a}{a}$

5. Extract the square root of $a^2 - 2ax + x^2 + 2a - 2x + 1$.

6. Solve the equations :—

   (i) $(3x - 1)^2 + (4x - 2)^2 = (5x - 3)^2$.

   (ii) $\dfrac{3x - 1}{\sqrt{3x + 1}} = 1 + \dfrac{\sqrt{3x} - 2}{2}$.

   (iii) $x + y - z = 3,\ x + z - y = 5,\ y + z - x = 7$.

7. A person has a number of rupees which he tries to arrange in the form of a square. On the first attempt he has 116 over. When he increases the side of the square by three rupees he wants 25 to complete the square. How many rupees has he?

XII—(1876.)

1. Find the value of (i) $\dfrac{\sqrt{3 - 2x^2} - x}{x(1 + 3x) - x^3}$ when $x = -\dfrac{1}{3}$

(ii) $1-[1-\{1-(1-\overline{1-1})\}]$.

What is the use of *brackets*? What is the rule for removing brackets which are preceded by a *minus* sign?

2   Simplify the expressions :—

(i) $\dfrac{9a^2b^2}{16(x+y)} \div \left[\dfrac{3a(x-y)}{7(c+d)} \div \left\{ \dfrac{4(c-d)}{21ab^2} \div \dfrac{c^2-d^2}{4(x^2-y^2)} \right\} \right]$.

(ii) $\left(\sqrt{\dfrac{a+x}{x}} - \sqrt{\dfrac{x}{a+x}} \right)^2 - \left(\sqrt{\dfrac{c}{a}} - \sqrt{\dfrac{a}{c}} \right)^2 + \dfrac{c^2}{a(a+c)}$

3   What is meant by a *coefficient*? Find the coefficient of c in the quotient obtained by dividing $8x^4 + xy^3 - y^4$ by $x - \dfrac{y}{2}$.

4   Separate into their simplest factors:—

(i) $x^2 - xy - 6y^2$, (ii) $x^3 - 4xy^2 - x^2y + 4y^3$,

and find the highest common divisor of

$$1 - x^{\frac{1}{2}} + x + x^{\frac{3}{2}} \text{ and } 2x + 2x^{\frac{3}{2}} + 3x^2 + 3x^{\frac{5}{2}}.$$

5   Shew that $\left(\dfrac{x}{a} - \dfrac{y}{b} \right)\left(\dfrac{x}{b} - \dfrac{y}{a} \right) = 0$.

6. State and prove the rule for finding the L. C. M. of two or more algebraical expressions.

Find by inspection the L. C. M. of $2x^2 - 8$, $3x^2 - 9x + 6$ and $6x^2 + 18x + 12$.

7. Extract the square root of

$$4x^4 - 12x^{-2} + 25x^{-5} - 24x^{-5} + 16x^{-8}$$

and the cube root of

$$8x^9 - 12x^3 + 6x^7 - 37x^6 + 36x^5 - 9x^4 + 54x^3 - 27x^2 - 27.$$

8. Distinguish between an *equation* and an *identity*, and give an example of each.

What value of c makes

$$(x-2)^2 - (x-1)(x-3) = c$$

an identity ? Can any value of c make it an equation ?

9. If the telegraph posts by the side of a railway be 60 yards apart, shew that twice the number passed by a train in a minute gives roughly the number of miles per hour at which the train is moving. If 11 posts be passed in a minute, in what time would the distance traversed, estimated by this rule, be 1 mile in error ?

10. A boy receives a fixed sum as pocket-money at the beginning of every week, and in each week he spends half of all that he had at its beginning. He had no money before the first pocket-money was given him and at the end of the third week he has 1s. 2d. What was his weekly allowance ?

XIII—(1877.)

1. Remove the brackets from the expression :—

$$\left\{ m-n-\overline{3x-2y} \right\} - \left\{ 2x+5y-\overline{n+m} \right\}$$

and enclose the last three terms of the expression $a-b+c$ $-2d-1$ in a bracket with a negative sign.

2. Find the quotient which arises from dividing the third power of $10a^2$ by the square root of one million times a^{12}.

3. Extract the square root of
$$x^4-6x^3y + 13x^2y^2 - 12xy^3 + 4y^4.$$

4. Find the G. C. M. of $21x^3-26x^2+8x$ and $6x^2-x-2$; and the L. C. M. of x^2-1, x^2+2x-3, and x^3-7x^2+6x.

5. Reduce . (i) $a + \left(\dfrac{b-a}{1+ba}\right) \times \dfrac{a}{b} + \left(1 - a\,\dfrac{b-a}{1+ba}\right).$

   (ii) $\dfrac{3\frac{1}{4} - \frac{1}{3}(x - \frac{4}{2})}{1\frac{1}{2} + (x - \frac{2}{3})},$

6. Solve (i) $(x-a)(x-b) = ab - x^2.$

   (ii) $\sqrt{x+4} + \sqrt{2x+9} = \sqrt{3x+25}.$

   (iii) $\dfrac{4}{x} - \dfrac{5}{y} = \dfrac{x+y}{xy} + 1\frac{13}{31}.$

   $xy = \dfrac{35}{34}(y-x).$

7. From a certain sum of money I took away one-third part and put in its stead Rs. 50; from the sum thus increased I took away one-fourth part and put in its stead Rs. 70. I then found I had Rs. 120; what was the original sum?

8. A certain number consists of two digits whose sum is 8 another number is obtained by reversing the digits. If the product of these two is 1,855, find the number.

———

ENTRANCE EXAMINATION PAPERS.

ALGEBRA.

I—(1873.)

1. What is the difference between the factors and terms of an Algebraical expression? When are such expressions said to be homogeneous? Of what use are brackets in Algebra? Simplify

$$2(a + b)(a - b + c) - (a + c)^2 - 2c(b - c).$$

2. Divide $(1 - a^2)(1 - b^2)(1 - c^2) - (a + bc)(b + ac)(c + ab)$ by $1 - a^2 - b^2 - c^2 - 2abc.$

Write down the remainder when $x^3 - 7x - 4$ is divided by $x - 3$.

3. Find the greatest common measure of

$a^3 - a^2b + ab^2 - b^3$; $a^2 + ab - 2b^2$; and $a^4 - 2a^3b - 3a^2b^2 - 3ab^3 + b^4.$

4. A ship sails with a supply of biscuit for 60 days on a daily allowance of 1 lb. per head. After being at sea for 20 days she encounters a storm in which 5 men are washed overboard, and damages sustained that will cause a delay of 24 days. It is found that each man's allowance must be reduced to $\frac{3}{4}$ lb. Find the original number of the crew.

II—(1874.)

1. Simplify the following expressions :—

(1) $\dfrac{a^2}{(a-b)(a-c)(x+a)} + \dfrac{b^2}{(b-a)(b-c)(x+b)} + \dfrac{c^2}{(c-a)(c-b)(x+c)}.$

(2) $a - \left[5b - \left\{ a - 3(c-b) + 2 \left(c - \dfrac{a-2b-c}{2} \right) \right\} \right].$

2. Find the G. C. M. of $x^4 + 4(x^3 - 30) - (18x + 104)$ and $x^4 - 10(x^3 + 12) + x(24x + 36)$.

3. A man hires a workman on this condition that for every day he worked he should get one rupee, but that for every day he was absent, he should be fined 12 annas. When 365 days were past the workman was to receive 118 rupees : how many days had he worked ?

4   Solve the equation

$\sqrt{x} + \sqrt{x - \sqrt{1 - x}} = 1.$

5. A man meeting some beggars wished to distribute among them all the money he had in his pocket. He had not enough by 8 annas to give them 3 annas each, so he gave them 2 annas each, and had six annas remaining : how many beggars were there ?

III—(1876.)

1. (a) Divide $x^6 - 3x^4 y^2 + 3x^2 y^4 - y^6$ by $x^3 - 3x^2 y + 3xy^2 - y^3$

(b) What is the square root of :—

$4x^4 - 12x^3 + 11x^2 - 3x + \dfrac{1}{4}.$

2. (a) Simplify $\dfrac{1}{x-1} - \dfrac{1}{2x+2} - \dfrac{x+3}{2x^2 - 2}.$

(b) Find the greatest common measure of $x^6 + x^2 y - x^4 y^2 - y^3$ and $x^4 - x^2 y - x^2 y^2 + y^3.$

3. Solve the following equations :—

(a) $\dfrac{4x+3}{9} + \dfrac{7x-29}{5x-12} = \dfrac{8x+19}{18}.$

(b) $\sqrt{x} + \sqrt{a+x} = \dfrac{na}{\sqrt{a+x}}$

(c) $\dfrac{m}{x} + \dfrac{n}{y} = a, \quad \dfrac{n}{x} + \dfrac{m}{y} = b.$

4   A garrison had sufficient provision for 30 months, but at the end of 4 months the garrison was doubled. Three months after that 400 men were added, and it was found that the provisions lasted only 15 months altogether. What was the original strength of the garrison?

IV—(1878.)

1.   If $s = a + b + c$ prove that—

$(as + bc)(bs + ca)(cs + ab) = (b + c)^2(c + a)^2(a + b)^2.$

2.   Find the highest common divisor of

$20x^4 + x^2 - 1$ and $25x^4 + 5x^3 - x - 1.$

3   Simplify :—(i) $\dfrac{ax^m - bx^{m+1}}{a^2 b x - b^3 x^o}$.

(ii) $\dfrac{a^2 + b^2 + c^2 + 2ab + 2ac + 2bc}{a^2 - b^2 - c^2 - 2bc}$

4.   Find the square root of

$a^6 + 4a^5 + 2a^4 + 9a^2 - 4a + 4.$

5.   Solve the following equations :—

(1) $\left. \begin{array}{l} \frac{1}{2}(x + y) = \frac{1}{3}(2x + 4) \\ \frac{1}{3}(x - y) = \frac{1}{2}(x - 24) \end{array} \right\}.$

(2) $\dfrac{ax + b}{cx + b} + \dfrac{bx + a}{cx + a} = \dfrac{(a + b)(x + 2)}{cx + a + b}$

(3) $\frac{1}{2}(3c + 8) - \{x - \frac{1}{2}(x - 2)\} = x - 3.$

6.   A person walked out a certain distance at the rate of $3\frac{1}{2}$ miles an hour, and then ran part of the way back at the rate of 7 miles an hour, walking the remaining distance in 5 minutes. He was out 35 minutes, how far did he run?

ENTRANCE EXAMINATION PAPERS.

ALGEBRA.

I—(1870-71) & (1871-72.)

1 Multiply $a^{\frac{5}{2}} + a^2 b^{\frac{1}{3}} + a^{\frac{5}{2}} b^{\frac{2}{3}} + a^{\frac{3}{2}} b + a^{\frac{1}{2}} b^{\frac{4}{3}} + b^{\frac{5}{3}}$ by $a - 2a^{\frac{1}{2}} b^{\frac{1}{3}} + b^{\frac{2}{3}}$.

Multiply $a^{\frac{5}{6}} - a^{1\frac{5}{2}} b^{\frac{5}{8}} + b^{\frac{5}{4}}$ by $a^{\frac{5}{6}} + a^{1\frac{5}{2}} b^{\frac{5}{8}} + b^{\frac{5}{4}}$.

and prove that the result is a factor of

$$a^{\frac{10}{5}} + a^{\frac{5}{5}} b^{\frac{5}{2}} + b^5,$$

2 Find the G. C. M. of

$2y^3 + y^2 - 8y + 5$, and $7y^2 - 12y + 5$.

3. Reduce the following expressions to their simplest form : —

(a) $\dfrac{x^4 + x^2 y^2 + y^4}{x^4 + 2x^3 y + 3x^2 y^2 + 2x y^3 + y^4}$.

(b) $\dfrac{1}{(a-b)(a-c)(x+a)} + \dfrac{1}{(b-a)(b-c)(x+b)} + \dfrac{1}{(c-a)(c-b)(x+c)}$.

4. A farmer sells to one person 9 horses and 7 cows for £300: and to another 6 horses at an advance of $12\frac{1}{2}$ per cent. on the former price, and 13 cows at an advance of 8 per cent. for £330$\frac{11}{12}$. What was the price of each ?

II.—(1872-73.)

1. State the method for finding the G. C. M. of two Algebraical expressions. What artifices are permissible or employed to shorten the process?

2. Find the G. C. M. of
   $16x^4 - 8x^3 + 8x^2 + 2x + 3$ and $16x^4 + 16x^3 - 2x - 2$, and the L. C. M. of
   $x^3 + a^3$, $x^5 + a^5$, $x^2 - ax + a^2$, $x^2 + ax + a^2$.

3. Simplify the following expression :—
   $$\frac{a+b}{a-b} + \frac{b+c}{b-c} + \frac{c+a}{c-a} + \frac{(a+b)\,(b+c)\,(c+a)}{(a-b)\,(b-c)\,(c-a)}.$$

4. Prove that $\left(x + \dfrac{1}{x}\right)^2 + \left(y + \dfrac{1}{y}\right)^2 + \left(z + \dfrac{1}{z}\right)^2$

   $= 4 + \left(x + \dfrac{1}{x}\right)\left(y + \dfrac{1}{y}\right)\left(z + \dfrac{1}{z}\right)$ if $xyz = 1$.

5. Extract the square root of
   $5x^6 - 4\sqrt{5}x^5 + 2(2 + \sqrt{15})x^4 - 2(2\sqrt{3} + \sqrt{5})x^3 + 7x^2$
   $- 2\sqrt{3}x + 1$.

6. Solve the equations :—

   (a) $\sqrt{x^2 + x + 1} + \sqrt{x^2 - x + 1} = 2$.

   (b) $5x - 2y + z = 20$, $x + 2y + 5z = 28$, $4x + 5y - 7z = 19$.

III—(1873-74.)

1. Find the G. C. M. of
   $$y^3 - \overline{2a + b}y^2 + \overline{2ab + a^2}y - a^2b$$
   and of
   $$3y^2 - (4a + 2b)y + (2ab + a^2)$$
   and of
   $x^3 + y^3 + z^3$ and $x^5 + y^5 + z^5$ if $x + y + z = 0$.

Solve any three of the following equations :—

(a) $\dfrac{x - 2\frac{1}{2}}{1\frac{2}{3}} + \dfrac{3x - 9}{3\frac{6}{11}} = \dfrac{x + 8\frac{1}{3}}{1\frac{5}{9}} + \dfrac{x}{10}.$

(b) $\sqrt{a + bx + cx^2} + \sqrt{a - bx + cx^2} = d.$

(c) $\sqrt{1 + x} + \sqrt{1 + \sqrt{1 + x}} = 11.$

(d) $x + y = 5, \quad \dfrac{x}{y} - \dfrac{y}{x} = 3\frac{1}{4}.$

2   Simplify the following expressions :—

$$\dfrac{a^3}{(a - b)(a - c)} + \dfrac{b^3}{(b - a)(b - c)} + \dfrac{c^3}{(c - a)(c - b)}$$

and $\dfrac{2 + \sqrt{3}}{\sqrt{2 + \sqrt{2 + \sqrt{3}}}} + \dfrac{2 - \sqrt{3}}{\sqrt{2 - \sqrt{2 - \sqrt{3}}}}.$

4.   Reduce $\dfrac{1 + \sqrt{x} + x + \sqrt{x^3}}{2x + 2\sqrt{x^3} + 3x^2 + 3\sqrt{x^5}}.$

5   What number is that whose square is less by unity than the number itself ?

An express train sets off to travel from one station to another with uniform speed; at the end of the first hour an accident occurs which delays it 1 hour, and reduces its speed in the rate of 5 : 3. It arrives at the second station 3 hours behind time ; if the accident had occurred 50 miles further on the train would have arrived $1\frac{1}{2}$ hour sooner.   What was the distance between the stations ?

IV—(1875-76.)

1.   Prove that $x^4 + px^3 + qx^2 + rx + s$ is a perfect square

If $p^2 s = r^2$ and $q = \dfrac{n^2}{4} + 2\sqrt{s}.$

2.   Prove that $\dfrac{2 + \sqrt{3}}{\sqrt{2 + \sqrt{2 + \sqrt{3}}}} + \dfrac{2 - \sqrt{3}}{\sqrt{2 - \sqrt{2 - \sqrt{3}}}} = \sqrt{2}$

3. Solve $\dfrac{1}{\sqrt{1-x}+1} + \dfrac{1}{\sqrt{1-x}-1} = \dfrac{1}{x}$

4. Suppose a silver coins or b gold coins are worth s. How can the sum s be paid away in c coins in all?

5. A, B together can do a work in a days; A, C, together in b days; B, C, together in c days. In how many days can A do it alone?

V—(1876-77.)

1. Add $\dfrac{2}{a-b} + \dfrac{2}{b-c} + \dfrac{2}{c-a} + \dfrac{(a-b)^2+(b-c)^2+(c-a)^2}{(a-b)(b-c)(c-a)}$.

Multiply $\dfrac{x^2+xy}{x^2+y^2}$ by $\dfrac{x^3+y^3}{xy(x+y)}$.

2. Solve the following equations :—

(i) $(a+x)(b+x)-a(b+c) = \dfrac{a^2c}{b}+x^2$.

(ii) $\dfrac{m(x+a)}{x+b} + \dfrac{n(x+b)}{x+a} = m+n$.

(iii) $13x+11y=4a,\ 12x-6y=a$.

(iv) $\sqrt{x^2+9}+\sqrt{x^2-9} = \sqrt{34}+4$.

3. Two plugs are opened in the bottom of a cistern containing 192 gallons of water; after three hours, one of the plugs becomes stopped, and the cistern is emptied by the other in 11 more hours: had the stoppage occurred after 6 hours, only 6 hours more would have been required to empty the cistern. How many gallons will each plug have discharged in an hour, supposing the discharge uniform?

VII—(1877-78.)

1. Find the value of $\dfrac{x+y}{y} - \dfrac{x}{x+y} - \dfrac{x^2-x^2y}{x^2y-y^3}$.

2. Show that $a^2 - 6ab + 17b^2 - \dfrac{16b^3(2a+b)}{(a+b)^2} = \dfrac{(a-b)^4}{(a+b)^2}$.

3   Required in its simplest form the product of

$$\frac{pr+(pq+qr)x+q^2x^2}{p-qx} \times \frac{ps+(pt-qs)x+qtx^2}{p+qx}.$$

4. Prove that if $\sqrt{(a+\sqrt b)} = x + \sqrt y$ then $\sqrt{(a-\sqrt b)} = x - \sqrt y$

5   Solve (i) $ax + 1 = 2\dfrac{ax(x+a^2)^{\frac{1}{2}}}{a+(x+a^2)^{\frac{1}{2}}}$.

(ii) $\dfrac{x}{a} + \dfrac{y}{b} = 1 - \dfrac{x}{c}$, $\dfrac{y}{a} + \dfrac{x}{b} = 1 + \dfrac{y}{c}$.

VII—(1879-80.)

1. Find the Greatest Common Measure of

$6a^4x^5 - 10a^3x^4y - 9a^3x^2y^2 + 15ax^3y^3$ and $10a^4xy^2 - 15a^3x^4 + 8a^2x^2y^3 - 12axy^3$.

2. I went to a bank with a cheque for 6 guineas, and asked to have for it exactly the same number of sovereigns, half-sovereigns, shillings and sixpences. How many of each should I get?

3   Simplify $\dfrac{x+(x^2y)^{\frac{1}{3}}-(x^2y)^{\frac{1}{3}}}{x+y}$

and also $\dfrac{ab}{b-c} \pm \left\{ \dfrac{a^2b^2}{(b-c)^2} - \dfrac{a^2b}{b-c} \right\}^{\frac{1}{2}}$.

4   There is a number consisting of two digits the number is equal to three times the sum of its digits, and if it be multiplied by 3, the result will be equal to the square of the sum of the digits. Find the number.

MATRICULATION EXAMINATION PAPERS.

ALGEBRA.

I.

1 Add together

(1) $(1+2c-4y)$ and $(2-3c+6y)$

(2) $(a+b-c)^2$ and $(a-b+c)^2$

(3) From $5c^2+6cy+y^2$ take $(4a^2-3cy+2y^2)$

Multiply $(a^2-2ab+b^2)$ by $(a^2+2ab+b^2)$

$$\left(c^{-\frac{3}{4}} + x^{-\frac{1}{2}}y^{-\frac{1}{4}} + x^{-\frac{1}{4}}y^{-\frac{3}{4}} + y^{-\frac{3}{4}} \right) \text{ by } \left(c^{-\frac{1}{4}} - y^{-\frac{1}{4}} \right)$$

Divide $x^2+10x-600$ by $(x+30)$

$$\frac{x^2}{x-9} \quad \text{by} \quad \frac{x}{x+3}.$$

2 Solve the following equations :—

(1) $3x-14=11c+16.$

(2) $\dfrac{x}{6} + \dfrac{2c}{3} - \dfrac{7}{2} + \dfrac{3x}{\cdot} = c+3+\dfrac{1}{x}$.

(3) $4x+7y=62,\ 3y-2x=8.$

If $x:x+3::3:4.$ Find $x.$

3. A railroad travels at the rate of 24 miles an hour ; two hours
after it has started an express-engine travelling at the rate
of 40 miles an hour is sent to overtake it   After what
time and what number of miles will the express come up
with the train ?

II.

1. Add together $\left(\dfrac{a}{2} + \dfrac{b}{3} - \dfrac{c}{4} \right)$ and $\left(a - \dfrac{2b}{5} + \dfrac{c}{6} \right)$

   From $(7x^2-8xy+9y^2)$ take $(5x^2+11xy+8y^2)$.

   Multiply $5x^3+7x^2y-9xy^2+3y^3$ by $(2x^2-3xy+y^2)$.

   Divide $3x^4+16x^3y-33x^2y^2+14xy^3$ by x^2+7xy

   Reduce $\dfrac{x^3}{x^3-1} - \dfrac{x}{x-1} + \dfrac{2x^2}{x^2+x+1}$.

2. Solve the following equations.—

   (1) $7x-10 = 5x-4$

   (2) $\dfrac{x}{3} - \dfrac{x}{4} + \dfrac{x}{6} = 3.$

   (3) $3c + \dfrac{7y}{2} = 22,\ 11y - \dfrac{2x}{5} = 20.$

   (4) $2y - \dfrac{x+3}{4} = 7 + \dfrac{3x-2y}{5}$
        $4x - \dfrac{8-y}{3} = 24-x$ $\Big\}$.

3. If $a\ b::c:d$, and a the greatest magnitude.

   Prove (1) $\overline{a-b} : \overline{a+b} :: \overline{c-d} : \overline{c+d}.$

   (2) $(a+d) \gtrless (b+c).$

III.

1. Add together $(3a+4b+5c),\ (2a-9b+6c),\ (4a-3b-7c).$

   From $(a+b)^2$ take $(a-b)^2$.

   Multiply (x^3-7x^2+8x-9) by (x^2-2x+1).

   Divide x^4-81y^4 by $x-3y$.

   Explain the equation $x^8 \times x^{10} = x^{18}.$

2 • Solve the equations :—

(1) $4c-2=3x+3.$

(2) $\dfrac{c+1}{2} + \dfrac{x+2}{3} - \dfrac{5-c}{4} = 14.$

(3) $\dfrac{x-3}{x+2} = \dfrac{1}{2} + \dfrac{x-3}{2c-1}.$

(4) $\begin{array}{l} \dfrac{x}{2} + \dfrac{y}{3} = 13 \\[2mm] \dfrac{x}{5} + \dfrac{y}{8} = 5 \end{array} \Bigg\}$

3. If $a.b::c:d:e:f,$

Prove (1) $a:b::a+c+e:b+d+f.$

(2) $a.b::c-e.d-f.$

IV.

1 What is the coefficient of an Algebraical quantity ?

Is any coefficient understood when none is expressed ?

Reduce $(7x+5y)+(2x-3y)-(x-y).$

Multiply $(7x^3-3x^2y+2xy^2-6y^3)\times(3x-4y).$

Divide $(6a^3-a^2b-14ab^2+3b^3)$ by $(2a-3b).$

Reduce $1-\dfrac{(a-b)^2}{(a+b)^2}.$

2 Solve the following equations :—

(1) $5x-11=3x+13.$

(2) $\dfrac{3x}{5} - \dfrac{4x}{10} + \dfrac{11x}{15} = \dfrac{24-2x}{3}.$

(3) $3x-2y=11, \ 4x+7y=63.$

(4). $2x - \dfrac{3x-y}{7} = 15 + \dfrac{x}{2}$.

$$3y - \dfrac{5x-4}{8} = \dfrac{x+y}{3} + 29.$$

3. Find a third proportional to 5, ·05.

If $7x+5y : 7x-5y :: 31 : 11$, find $x : y$.

If $a : b :: c : d : e : f$.

Prove (1) $\dfrac{a}{e} = \dfrac{b}{f}$.

   (2) $a : b :: (a+c+e) : (b+d+f)$.

V.

1. Divide $(a^3 - 9a^2b + 23\,ab^2 - 15b^3)(a-7b)$ by $a^2 - 8ab + 7b^2$.

2. Find the G. C. M. of

   (i) $x^7 - 1$ and $x^3 + 2x^2 + 2x + 1$.

   (ii) $12x^3 + 13x^2 + 6x + 1$ and $16x^3 + 16x^2 + 7x + 1$.

3   Add together $\dfrac{a^2 + b^2}{2}$ and $ab + bc + ac$, when $a = -(b+c)$.

   Write down the fourth power of $a-b$.

4. Simplify (i) $\dfrac{1}{x+5} - \dfrac{3}{x+3-\dfrac{6}{x+2}}$.

   (ii) $\dfrac{1}{(x+1)(x+2)} + \dfrac{1}{(x+2)(x+3)} + \dfrac{1}{(x+3)(x+4)}$.

5. Simplify (i) $(x+y)^3 + (x+y)^3 y - \{3x^2y + 5y^2x + 2y^3\}$.

   (ii) $\dfrac{a^2 - 3ab + 2b^2}{a-2b} - \dfrac{a^2 - 7ab + 12b^2}{a-3b}$.

6 Solve the equations:—

(i) $\dfrac{x+3}{4} - \dfrac{x-1}{2} = \dfrac{1}{3}\left(x + \dfrac{x}{2} + \dfrac{3}{2} \right).$

(ii) $\left.\begin{array}{l} 3x - y = 3 \\ 5x + 7y = 31 \end{array}\right\}$; (iii) $\left.\begin{array}{l} x + y = a \\ y + z = b \\ z + x = c \end{array}\right\}.$

7 Prove that if $a : b :: c : d$, then
   $ma + nb : pa + qb :: mc + nd : pc + qd.$

   Prove that if $\dfrac{a^2 + ab + b^2}{c^2 + cd + d^2} = \dfrac{a^3 - b^3}{c^3 - d^3} : \dfrac{d}{b}$,

   then $a : b :: c : d.$

8 There is a certain number of two digits which is 7 times the
   sum of the digits. If the number be read backwards and
   subtracted from the original number, the difference is 27.
   Find the number.

VI.

1 Add together $s-a$, $s-b$, $s-c$, where $s = \dfrac{a+b+c}{2}$

   Subtract $\dfrac{2x^2 - 13x - 1}{x^2 - 1}$ from $\dfrac{5x - 3}{x + 1}$.

   Write down the result of the divisions of $x^9 + y^9$ by $x + y$.

2 Simplify $\dfrac{\{(ax + by)^2 + (ay - bx)^2\} \{(ax + by)^2 - (ay + bx)^2\}}{x^4 - y^4}$

3 Solve the equations:—

   $\dfrac{x+1}{3} - \dfrac{1}{2}(x + 3 - \tfrac{2}{3}x) = x - 2.$

   $\dfrac{2x + 7}{x - 1} - \dfrac{x + 1}{x + 7} = 1.$

   $\dfrac{a}{x} + \dfrac{b}{y} = 1, \quad \dfrac{a'}{x} + \dfrac{b'}{y} = 1.$

4. By reference to Bradshaw it is found that two railway trains moving in opposite directions pass each other somewhere between two stations A and B. One train leaves A at 20 minutes past 4 and arrives at B at 5. The other leaves B at 10 minutes past 4 and arrives at A at 20 minutes to 5. Find the time at which they meet.

VII.

1. Find the values of the expressions $\left(\dfrac{x}{y} + \dfrac{y}{x} \right)$ and $\dfrac{x^3 - y}{x - y}$ when $x = 6$, $y = 4$; will the values be the same if $y = 6$, $x = 4$?

2. Perform the operations indicated in the following examples

    (1) $\left(a^2 + 3b^2 - \dfrac{c^2}{2} \right) - \left(a^2 - 2b^2 - \dfrac{3c^2}{2} \right)$.

    (2) $(a^5 + 3a^2x + 3ax^2 + x^3) \times (a^2 - 2ax + x^2)$.

    (3) $(x^4 - 23x^2 + 18x + 40) \div (x^2 + x - 20)$.

    (4) $(1 + x + x^2)^2 - (1 - x + x^2)^2$.

3. Solve the following equations:—

    (1) $\dfrac{x - 2}{3} - \dfrac{x - 3}{5} = \dfrac{x + 40}{12}$.

    (2) $\dfrac{3x - 14}{4} - 5x - \dfrac{2x - 6}{11} = \dfrac{x}{2} - 72$.

    (3) $(3x + 8) = 4y - 4 = 2(x + y - 1)$.

4. Wishing to buy a certain number of railway shares, I found that if I bought the shares in the railway (A) which were at £40 a share, I should invest all my money; but if I bought the same number of shares in a railway (B) which were at £45 a share, I should not have money enough by £240. How much money had I to invest?

5. Find a fourth proportional to 1·5, ·09, ·45.

    If $a : b :: c : d$ and $e : f :: g : h$ prove $ae : bf :: cg : dh$.

    If $x^2 - y^2 : x^2 + y^2 :: 5 : 13$, prove $x : y :: 3 : 2$.

VIII.

1. Find the value of x^2-5x+7 when $x=3$: explain why $(x-4)^2$ and $(4-x)^2$ have the same value for any integral value of x. Simplify the following expressions:—

   (1) $3a+5b-\dfrac{c}{2}-\left\{a-\dfrac{2b}{3}+\dfrac{c}{4}\right\}$.

   (2) $(x^4-4x^3y+6x^2y^2-4xy^3+y^4)\times(x^2-2xy+y^2)$.

   (3) $\dfrac{6x^3-19x^2y+18xy^2-5y^3}{2x^2-3xy+y^2}$.

2. Solve the following equations:—

   (1) $\dfrac{x-2}{5}-\dfrac{2x-7}{10}+15=\dfrac{16x-39}{10}$.

   (2) $\left.\begin{array}{c}\dfrac{3x+2y-3}{4x-5y+16}=\dfrac{9}{4}\\ 3x=5y\end{array}\right\}$.

3. A courier undertakes to perform a journey on foot of 60 miles within 12 hours; he travels $6\frac{1}{2}$ miles the first hour, but afterwards in every successive hour he travels $\frac{1}{4}$ of a mile less than in the preceding hour: will he perform his undertaking?

4. Find a third proportional to $\dfrac{2a^2b^2}{a^2+b^2}$ and ab.

   If $a:b::c:d$ prove

   $(a^2+c^2)^{\frac{1}{2}}:(b^2+d^2)^{\frac{1}{2}}::a:b$.

IX.

1 Simplify the expressions:—

   $(2-x+3x^2)-\frac{1}{2}(4-2x+x^2)$

   $\dfrac{(1-x^2)(1-x^3)}{x^2(1+x)(1-x)^2}-\dfrac{x^3+\dfrac{1}{x^3}}{x^2+\dfrac{1}{x^2}-1}$.

Find the factors of $1-4x+3x^2$ and determine the value of

$$\left(\frac{a-b}{b-c}\right)+\frac{1}{2}\left(\frac{5(a+c)}{2b}\right) - \frac{2b-c}{2} \text{ when } a=4, b=2,$$

$c=1$

2   Solve the equations :—

(i) $1+\dfrac{x}{2}-\dfrac{x}{3}= \quad 4 \quad -\dfrac{x+1}{7} \quad - \quad \dfrac{x-1}{5}$.

(ii) $\left.\begin{array}{l} \dfrac{x+1}{v-1} + \dfrac{v}{x-4} = 5. \\[2mm] \dfrac{c+1}{y-1} - \dfrac{3y}{x-4} = 1. \end{array}\right\}$.

3   Extract the square roots of $4\cdot 04010$ and of $(x^2+1)^2+4x(x^2-1)$.

Find what value of x will make $x^2+2ax+b^2$ the square of $x+c$. What does your result become when $a=b=c$?

4.   When are four quantities said to be in proportion ?

What value must be given to x to make $1+x, 2+x, 9-x,$ and $10-x$ proportionals ?

If $a : b :: c : d$ prove the equality

$$\frac{a^3+b^3}{c^3+d^3} \cdot \frac{b}{d} = \left(\frac{a+b}{c+d}\right)^4.$$

5   If 6 men can dig 14 yards per day of a trench 3 feet wide and 2 feet deep, how many men will be required to dig 12 yards in a day of a trench 7 feet wide and 6 feet deep ?

X.

1.   Add together $a + 3b + 5c, 3a-7b + 11c, 4a-5b-15c$ and $a+18b+8c$; and multiply the result by the difference between $11a+7c$ and $10a+6c-b$.

Simplify the expression

$$\left(\frac{1-x+x^2}{1+3x+2x^2} - \frac{1-3x+2x^2}{1+x+x^2} \right) \cdot \frac{1+2x}{2-x^2} .$$

and resolve $x^4 + a^2 x^2 + a^4$ into two quadratic factors.

2. Solve the equations :—

(i) $\dfrac{x-1}{4} - \dfrac{2x-3}{5} = 11 - \dfrac{5x-7}{20}$.

(ii) $x - \dfrac{c^2}{x-a} = a$.

(iii) $\left. \begin{array}{l} a(x+y) = xy \\ b(x-y) = xy \end{array} \right\}$.

3. If $a : b :: c : d$, prove that

$a+b : a-b :: c+d : c-d$,

and $a^2 c + ac^2 : b^2 d + bd^2 :: a^3 + c^3 : b^3 + d^3$.

Also if $a+b+c+d : a+b-c-d :: b+d : b-d$, prove that

$a : b :: c : d$.

XI.

1. Simplify $\dfrac{4}{x-1} - \dfrac{3x+1}{x^2 - \frac{3}{4}x - \frac{1}{8}}$ and $\dfrac{x^3 + x^2 + x - 3}{x^3 - x - 6}$.

2. Solve $\dfrac{2x+1}{3} - \dfrac{3x-2}{4} = \dfrac{x-2}{6}$.

3. Prove that if $a : b :: c : d$, then

$a+b : a-b :: c+d : c-d$

$:: \sqrt{ac} + \sqrt{bd} : \sqrt{ac} - \sqrt{bd}$.

4. Extract the square root of

$$x^4 - 2x^3 + 3x^2 - 2x + 1$$

and the fourth root of $\quad x^2 + \dfrac{1}{x^2} + 4\left(x + \dfrac{1}{x} \right) + 6.$

XII.

1. Find the value of $x^3 - 5x + 6$, first when $x = 2$, and secondly when $x = 3$.

   Simplify the following expressions :—

   (i) $a + 3b - (5c - 9b) - (4a + 3b) - (-6a + b)$.

   (ii) $(8xy - 4xz)(2xy + xz) - 16x^2 y^2$.

   (iii) $\dfrac{\dfrac{x^4}{4} - x^2 + 1}{\dfrac{x^2}{2} - x + 1}$.

   and write down the fifth power of $x - a$.

2 Solve the equations :—

   (i) $\dfrac{v-1}{3} + \dfrac{2x-3}{4} = \dfrac{5}{4} + \dfrac{2x+1}{9}$.

   (ii) $\left.\begin{array}{l} \dfrac{1}{x} + \dfrac{2}{y} = 8 \\[2mm] \dfrac{4}{x} - \dfrac{2}{y} = 2. \end{array}\right\}$

3. Prove that if $a : b :: c \cdot d$ then $a + b : a - b :: c + d : c - d$.

   Find a third proportional to $a^3 + b^3 + ab(a + b)$ and $a^2 - b^2$.

4. A policeman runs after a boy who starts a little distance ahead. Three of the policemen's steps are equal to five of the lad's ; but the boy takes three while the policeman takes two steps. Will the policeman catch the boy ?

XIII.

1. Add together $x + y$, $3x - y - z$, and $4y - 2x - z$, and multiply the result by $x - y - z$.

   Find the value of $\dfrac{x^5 - x^4 y + x^3 y^3}{y^5 - y^4 x + y^3 x^3}$ when $x = 2y$.

And prove that

$$(x+y)\ (x^2+y^2)\ (x^4+y^4) = \frac{x^8-y^8}{x-y}.$$

Simplify the expression $\dfrac{1}{2} \cdot \dfrac{1}{x-1} \cdot \dfrac{x-5}{x^2-7x+10}$

$$+\frac{1}{2} \cdot \frac{x-6}{x^2-9x+18}.$$

2. Solve the equations :—

   (i) $\dfrac{x-1}{5} - \dfrac{x-11}{7} + \dfrac{3x-(5x-4)}{2} + \dfrac{278}{35} = 0.$

   (ii) $5x + 11y = 146,\ 11x + 5y = 110.$

3   If $a : b :: c : d$ prove that

     $a+b : a-b :: c+d : c-d.$

     and $a^2+c^2 : b^2+d^2 :: \sqrt{a^4+c^4} : \sqrt{b^4+d^4}.$

UNIVERSITY OF OXFORD

MATRICULATION EXAMINATION PAPERS.

——◆◇◆——

ALGEBRA.

I.

1. Find the value of

$$\frac{(a-b)^2}{a+b} + \frac{(b-c)^2}{b+c} + \frac{(a-c)^2}{a+c}.$$

when $a = 5$, $b = 3$, $c = 1$.

2. What is the Least Common Multiple of $12x(x-1)^2$, $15(x^5 - x^3)$, and $30x^2(x+1)$.

3. Simplify :—

(1) $\dfrac{3x^3 - 6x^2 + x - 2}{x^3 - 7x + 6}$.

(2) $1\frac{1}{2}(3x-1) + 2\frac{2}{3}(2x+3) - 2\frac{1}{3}(x - \frac{1}{4})$.

4. Solve the following equations :—

(1) $\dfrac{2x-a}{b} - \dfrac{3x-b}{a} - \dfrac{3a^2 - 8b^2}{ab} = 0$.

(2) $\sqrt{x + 25} - \sqrt{x} = 1$.

(3) $2x - 3y + 4 = 2x + 6y - 5 = 11$.

5. Two sums of money are together equal to 54l. 12s. and there are as many pounds in the one as shillings in the other. What are the sums?

II.

1. Multiply

$a(b^3 - a^3) + b(c^3 - a^3) + c(a^3 - b^3)$ by $a + b + c$, and divide the product by $(b-c)(c-a)(a-b)$.

Divide $x+y^{\frac{1}{2}}+z^{\frac{1}{3}}-3x^{\frac{1}{3}}y^{\frac{1}{6}}z^{\frac{1}{9}}$ by $x^{\frac{1}{3}}+y^{\frac{1}{6}}+z^{\frac{1}{9}}$.

2. Find the G. C. M. of

$x^3+2x^4-5x^2-7x+3$, and $3x^6-3x^4-18x^3+x^2+2x+3$; and the L. C. M. of $18(a^3b-a^2b^2)$, $15(a^3-b^3)$, $30(a^3b^2+a^2b^3-ab^4)$.

3. Simplify :—

(1) $\dfrac{x^2-bc}{(a-b)(a-c)} + \dfrac{x^2+ca}{(b-c)(b-a)} + \dfrac{x^2-ab}{(c-a)(c-b)}$.

(2) $\left\{ \dfrac{x^2}{y}+y-x \div \left(\dfrac{x^2}{y^2} + \dfrac{y^3}{x^2} +1 \right) \right\} \times \left(\dfrac{1}{y} + \dfrac{1}{x} + \dfrac{v}{x^2} \right)$.

(3) $\dfrac{a^{\frac{1}{3}}b^{\frac{1}{3}}}{c^{\frac{1}{6}}} \div \left\{ \dfrac{c^{-\frac{1}{2}}}{a^{-\frac{1}{3}}b^{-\frac{1}{6}}} \times \dfrac{a^{-\frac{3}{6}}c^{-\frac{2}{3}}}{b^{\frac{1}{6}}} \right\}$.

4. Extract the square root of

(1) $x^4-6ax^3+13a^2x^2-12a^3x+4a^4$.

(2) $\dfrac{x^2}{4a^2} + \dfrac{4a^2}{x^2} - 1 + \dfrac{x}{a} - \dfrac{4a}{x}$.

5. Solve the equations :—

(1) $\frac{1}{4}(2x-5)+\frac{1}{3}(3x-8) = \frac{1}{20}(4x-3)$.

(2) $\begin{cases} x+y+z = 0. \\ x+2y+3z = 1. \\ x+3y+4z = 2. \end{cases}$

III.

1. Multiply

$(b+c)^2-a^2$ by $a^2-b^2-c^2+2bc$.

and divide the product by $b^2-(c-a)^2$.

Divide $x^{\frac{2}{3}} + y^{\frac{1}{2}} + z^{\frac{1}{3}} - 2y^{\frac{1}{4}} z^{\frac{1}{6}} - 2z^{\frac{1}{6}} x^{\frac{1}{3}} - 2x^{\frac{1}{3}} y^{\frac{1}{4}}$ by

$x^{\frac{1}{3}} + y^{\frac{1}{4}} - z^{\frac{1}{6}} + 2x^{\frac{1}{3}} y^{\frac{1}{8}}$.

2. Find the G. C. M. of

$x^5 + x^2 + 3x + 2$, and $x^4 + x + 1$.

and the L. C. M. of

$5x^2 - 15x + 10, 6x^2 - 6x - 12, 12x^2 - 12$.

3. Simplify :—

(1) $\dfrac{a}{b+c-a} + \dfrac{b}{c+a-b} + \dfrac{c}{a+b-c} + 1$.

(2) $\dfrac{x^4 - 5x^2 + 4}{x^2 + 1} \times \dfrac{\dfrac{1}{x} - \dfrac{1}{x+2}}{1 - \dfrac{1}{x^2}} \div \dfrac{2 - \dfrac{4}{x}}{1 + \dfrac{1}{x^2}}$.

(3) $\dfrac{a^{\frac{3}{4}} b^{\frac{1}{2}}}{c^{\frac{1}{3}}} \times \dfrac{a^{-\frac{1}{4}} c^{-\frac{1}{3}}}{b^{-\frac{1}{3}}} \div \dfrac{a^{-\frac{1}{2}} b}{c} \, b^{\frac{1}{5}} c^{\frac{2}{3}}$.

4. Extract the square root of

(1) $4x^4 + 12ax^3 + a^2x^2 - 12a^3x + 4a^4$.

(2) $\dfrac{9x^2}{a^4} + \dfrac{a^2}{9x^2} - 6 \, \dfrac{x}{a} - \dfrac{2a}{3x} + 3$.

5. Solve the following equations:—

(1) $\dfrac{x-b}{a} + \dfrac{x-a}{b} = \dfrac{ax-b^2}{a(a+b)}$.

(2) $\begin{cases} x + 6y + 5z = 0. \\ 2x - 9y + 3z = 0. \\ x + 3y + z = 3. \end{cases}$

IV.

1. Multiply $9x^2 + 4y^2 + z^2 - 2yz - 3xz - 6xy$ by $3x + 2y + z$.

2. Find the G. C. M. of $3x^4 - 3x^3 - 6x^2$ and $6x^4 - 12x^3 + 6x - 12$.

3. Extract the square root of

$$\frac{4x^2}{y^2} + \frac{4y^2}{x^2} - 8.$$

4. Simplify:—

   (i) $\dfrac{3x+2}{(x-1)^2} - \dfrac{6}{x^2-1} - \dfrac{3x-2}{(x+1)^2}.$

   (ii) $\dfrac{1}{1+\dfrac{1}{a}} \times \dfrac{1}{1-\dfrac{1}{a}} \div \dfrac{1}{a-\dfrac{1}{a}}.$

5. Solve the equations:—

   (i) $\frac{1}{2}(x-1) + \frac{3}{4}(x+2) = \frac{9}{4}(x-3)$·

   (ii). $3x + \frac{1}{3}y = 21,\ 2y + \frac{1}{3}x = 14.$

6. Find three numbers, whose sum is 21, and of which the greatest exceeds the least by 4, and the remaining one is half the sum of the other two.

7. If $a : b = b : c = c : d$, shew that

   (1) $a^3 : b^3 = a : d.$

   (2) $(a^2 + b^2 + c^2)(b^2 + c^2 + d^2) = (ab + bc + cd)^2.$

V.

1. Find the value of

$$\frac{(b-c)^3}{(c-a)(a-b)} + \frac{(c-a)^3}{(a-b)(b-c)} + \frac{(a-b)^3}{(b-c)(c-a)}$$

   when $a = 1,\ b = 2,\ c = 3.$

2. Find the G. C. M. of

$$4x^3 - 6x + 2 \text{ and } 9x^3 - 3x^2 - 6$$

and the L. C. M. of

$$x^4 - a^3x, \ ax^3 + x^4, \ x^4 + a^2x^2 + a^4.$$

3 Simplify :—

(1) $\dfrac{x}{(x-1)^3} - \dfrac{1}{(x+1)^3} - \dfrac{x(x^2+3)}{(x^2-1)^3}.$

(2) $\dfrac{1 + ax^{-1}}{a^{-1} \cdot x - 1} \times \dfrac{a^{-1}x^{-1}}{a^{-1}x - ax^{-1}} - \dfrac{ax^{-1}}{x - a}.$

4. Find the square root of

$$a^6 - 6a^5x + 15a^4x^2 - 20a^3x^3 + 15a^2x^4 - 6ax^5 + x^6.$$

5 Solve the equations :—

(i) $\dfrac{\frac{1}{2}(x-1) - 1\frac{3}{4}}{2\frac{1}{4} + \frac{1}{3}(x+2)} = \frac{6}{23}.$

(ii) $x^2 - xy + y^2 = 1\frac{3}{4} \left.\begin{matrix} \\ \\ \end{matrix}\right\}.$
       $\qquad x + y = 2$

VI.

1. Multiply $a^2 + b^2 + c^2 + d^2 - a(b+c+d) - b(c+d) - cd$ by $a+b+c+d.$

2. Extract the square root of

$$x^4 + \frac{1}{x^4} + 2\left(x^2 + \frac{1}{x^2}\right) + 3.$$

3. Simplify $\dfrac{x^2}{a + \dfrac{x^2}{a + \dfrac{x^2}{a}}}.$

4. Find the L. C. M. of

$a^2 - x^2$; $a^2 + 3ax + 2x^2$; $a^2 - 4x^2$.

and the G. C. M. of

$2x^3 - 16x + 6$ and $x^4 + 3x^3 + x + 3$.

5. Solve the following equations :—

(1) $\dfrac{x+4}{8} + \dfrac{x+5}{15} = \dfrac{x+1}{6} + \dfrac{x+6}{9}$.

(2) $\dfrac{x}{8} + \dfrac{y}{12} = 1 = \dfrac{x}{2} - \dfrac{y}{6}$.

6. Find the time between 2 and 3 o'clock when the hands of a watch are together.

7. If $a : b :: c : d$, prove that $a+b : a-b :: c+d : c-d$; and if $a+b : a-b :: c : d$, $(a+b)(c+d) = 2ac$.

VII.

1. If $(a+b+c)x = (-a+b+c)y = (a-b+c)z = (a+b-c)w$,

Shew that $\dfrac{1}{y} + \dfrac{1}{z} + \dfrac{1}{w} = \dfrac{1}{x}$.

2. Simplify :—

(1) $\dfrac{y}{2(x-y)} - \dfrac{y}{2(x+y)} - \dfrac{y^2}{x^2} - \dfrac{y^4}{x^3(x^2-y^2)}$.

(2) $(a+b+c)(a^{-1}+b^{-1}+c^{-1}) - a^{-1}b^{-1}c^{-1}(b+c)(c+a)(a+b)$.

3. Find the G. C. M. of $x^4 - x^3 - x + 1$ and $4x^3 - 3x^2 - 1$, and the L. C. M. of $x^3 - 1$, $x^3 + 1$, $x^3 + 2x^2 + 2x + 1$, $x^3 - 2x^2 + 2x - 1$.

4. Find the square root of

$x^2 + 2ax + 3a^2 + 2a^3 x^{-1} + a^4 x^{-2}$.

5. Solve the equations:—

(i) $-\dfrac{x-a}{b-2a} + \dfrac{2(x-l)}{a-2b} = 1.$

(ii) $x^{\frac{1}{2}} + (4a+x)^{\frac{1}{2}} = 2(b+x)^{\frac{1}{2}}.$

(iii) $\begin{cases} x - ay + a^2z = a^3 \\ x - by + b^2z = b^3 \\ x - cy + c^2z = c^3 \end{cases}$

VIII.

1. Find the value of $3a - \frac{1}{2}\{3b - 7(c-d)\}$ when $a = 7$, $b = 4$, $c = 3$, $d = 5$.

2. Multiply $a^4 - 3a^2 + 2 + \dfrac{2}{a^2} + \dfrac{3}{a^4}$ by $a - \dfrac{1}{a}$; and divide $x^4 + 2x^3y + xy^3 + 2y^4 - 3x^3z - 3y^3z$ by $x + 2y - 3z$.

3. Find the L. C. M. of $x^2 - 1$, $x^2 - 2x - 3$, $x^2 - 3x + 2$; and the G. C. M. of $x^4 - 1$, and $x^4 + 2x^3 + 4x^2 + 2x + 3$

4. Simplify $\dfrac{a^3 - x^3}{ax}\left(\dfrac{a+x}{a^2 - x^2} - \dfrac{a-x}{a^2 + ax + x^2}\right).$

5. Find the square root of
$$\dfrac{4x^4}{9} - 8x^3 + \dfrac{112}{3}x^2 - 12x + 1.$$

6. Solve the equations:—

(i) $2x - \frac{1}{3}(x + 27) = 16$

(ii) $x = \frac{2}{3} + \dfrac{x^2 - \frac{5}{3}}{x - 1}.$

7. Divide a yard into two parts such that half of one part with 22 inches may be double the other part.

8. If $a : b :: b : c :: c : d$, prove that

(1) $a^2 + c^2 : a^2 - c^2 :: ab + cd : ab - cd.$

(2) $a : b :: \dfrac{1}{b} + \dfrac{1}{c} + \dfrac{1}{d} : \dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c}.$

CAMBRIDGE UNIVERSITY

EXAMINATION PAPERS.

———◆———

ALGEBRA.

I.

1. Find the continued product of $x-a$, $x+a$, x^2-ax+a^2, and x^2+ax+a^2 and divide x^6-1 by $x-1$.

2. Simplify the expression

$$(a+b)-(2a-3b)-(5a+6b)-(-7a+b),$$

and find the value of the expression

$$\frac{x(x-1)a^3+(x^3+2x-2)a^2+(3x^2-x^3)a-x^4}{a^2x+2a-x^2}$$

when $x=2$ and $a=3$.

3. Prove that $(a-b)^3+(b-c)^3+(c-a)^3=3(a-b)(b-c)(c-a)$.

4. Shew that if

$a:b::b:c$ then will $5a+3b:7a+3b::5b+3c:7b+3c$.

5. Solve the equations:—

(a) $\cdot5x+\dfrac{\cdot45x-\cdot75}{\cdot6}=\dfrac{1\cdot2}{\cdot2}-\dfrac{\cdot3x-\cdot6}{\cdot9}$.

(b) $\dfrac{x+y}{x-y}+\dfrac{x-y}{x+y}=\dfrac{10}{3}$, $x^2-y^2=3$.

H

II.

1.   Find the continued product of $(x-a)(x+b)(x-c)(x+d)$ and divide x^6-1 by $x+1$.

2.   Simplify the expression

$$2a + [3y - \{4c - (5y - 6x - 7y)\}].$$

and find the value of the expression

$$\frac{x}{c-a} - \frac{x}{x+a} - \frac{\dfrac{x+a}{x-a} - \dfrac{x-a}{x+a}}{\dfrac{x+a}{x-a} + \dfrac{x-a}{x+a}},$$

when $c=2$, $a=1$.

3.   Shew that

$$(a+b)^3 - (b+c)^3 + (c-a)^3 = 3(a+b)(b+c)(a-c).$$

4.   Shew that if $a:b::c:d$

then will $10a+b : 10c+d :: 12a+b : 12c+d$.

5.   Solve the following equations:—

$$\cdot15x + \frac{\cdot135x - \cdot225}{\cdot6} = \frac{\cdot36}{\cdot2} - \frac{\cdot09x - \cdot18}{\cdot9}.$$

$$\left. \begin{array}{c} \dfrac{x+y}{x-y} + \dfrac{x-y}{x+y} = \dfrac{10}{3} \\[2mm] x^2 - y^2 = \dfrac{3}{4}. \end{array} \right\}$$

III.

1.   Multiply $3x + x^2 + 5x^3$ by $3x^2 + x^3 + 5x^4$ and divide the result by $x \cdots$, and shew the identity of the arithmetical and algebraical processes when $x = \frac{1}{10}$.

Divide $7x^3 - 24x^2 + 58x - 21$ by $7x - 3$.

2. Reduce to its simplest form the expression :—

(i) $\left\{ \dfrac{4a^3 - 14a^2b + 14ab^2 - 4b^3}{a - b} + \dfrac{5a^3 - 15a^2b + ab^2 + 21b^3}{a + b} \right\} \frac{1}{2}$

(ii) $\left\{ \dfrac{3a^3 - 7a^2b - 5ab^2 + 5b^3}{a + b} + \dfrac{6a^3 - 26a^2b + 40ab^2 - 20b^3}{a - b} \right\} \frac{1}{2}$.

3. Solve the equations:—

$$\left. \begin{array}{l} x - 4y = 7 \\ -\dfrac{x}{3y} + \dfrac{33}{10} = \dfrac{4x - y}{5y} \end{array} \right\} \quad (a). \quad \left\{ \begin{array}{l} 4x + y = 11 \\ \dfrac{y}{5x} = \dfrac{7x - y}{3x} = -\dfrac{23}{15}. \end{array} \right.$$

$\dfrac{x + 4}{x - 1} + \dfrac{x + 2}{x - 2} = 7$ $\qquad$ (b) $\dfrac{x + 5}{x - 5} + \dfrac{x + 6}{x - 6} = 19$.

$\sqrt{x + 6} + \sqrt{x - 5} = 11$ $\qquad$ (c) $\sqrt{x + 6} - \sqrt{x - 5} = 1$.

IV.

1. Add $16a^2 - 7ab - 8b^2 + 3c, 4b^2 - 8c + ab, 12ab - 8a^2 + 5c$

2. Find the values of $20ab - 7bc + 16ac - 5a^2$ when a, b, c, d are equal to 1, 3, 4, 5 respectively.

3. Multiply $a^2 + 2ab + b^2 - c^4$ by $a^2 - 2ab + b^2 + c^2$; and shew that the result may be expressed under the form $(a^2 - b^2)^2 - c^2(c^2 - 4ab)$.

4. Divide $(a^3 + b^3)^2 + 2a^2b(a^3 - a^2b - b^3)$ by $a^2 + b^2$.

5. Shew that $\dfrac{a + b}{a^2 + ab + b^2} - \dfrac{a - b}{a^2 - ab + b^2}$ may be put under

the form $\dfrac{2b^3}{a^4 + b^4 + a^2b^2}$

6. Solve the equations :—

   (1) $\dfrac{7x+2}{5} - \dfrac{4x-1}{2} = 0.$

   (2) $\dfrac{4c+5}{3} - \dfrac{7x+9}{4} = \dfrac{3x-8}{5} + 61.$

   (3) $4x-5y+7 = 0,\ 18x+14y-5 = 0.$

7. A has $\frac{3}{7}$th share in a concern and sells $\frac{1}{6}$th of $\frac{5}{8}$th of this share for £500; what is the value of $\frac{1}{7}$th of $\frac{1}{12}$th of the concern ?

8. A is 40 years older than B and in 4 years A will be 3 times the age of B. What are the respective ages of A and B ?

9 A can do a piece of work in 6 days, but with the help of B he can do it in $2\frac{2}{3}$ days. How long would B alone take to do the work ?

MISCELLANEOUS EXAMINATION PAPERS.

ALGEBRA.

I.

1 Multiply together $(a-x)(a+x)(a^2+x^2)(a^4+x^4)$.

2 Divide $1+c^3$ by $1+x$, and $1-x^3$ by $1-x$.

3 A garrison of 1000 men was victualled for 30 days. After 10 days it was reinforced, and the provisions at the original rate of issue lasted 5 days. Find the strength of reinforcement.

4 Define Greatest Common Measure.

5 If $\dfrac{a}{b} = \dfrac{c}{d} = \dfrac{e}{f}$ = &c., then each fraction is equal to $\dfrac{ma+nc+pe+\&c.}{mb+nd+pe+\&c.}$

6. A person rows from Cambridge to Ely, a distance of 20 miles and back again in 10 hours, the stream flowing uniformly in the same direction; he can row 3 miles with the stream in the same time as 2 miles against it. Find the time of his going and returning.

7. Simplify $\dfrac{\sqrt{x^2+1}+\sqrt{x^2-1}}{\sqrt{x^2+1}-\sqrt{x^2-1}} + \dfrac{\sqrt{x^2+1}-\sqrt{x^2-1}}{\sqrt{x^2+1}+\sqrt{x^2-1}}$.

8. By selling a horse for £24, I lose as much per cent. as it cost me. What was its cost?

II.

1 Collect coefficients in

$$4a^2cx^3 - x\{2abc^2 - 8c(4a - ab) + 2a^3c^3\}$$

2. Write down the square of $1 - 3x + \frac{1}{2}x^2$, the product of $4a^2 + ab \pm 2b^2$ by $ab - 2b^2 + 4a^2$, and the quotient of $x^{12} - y^{12}$ by $x^3 + y^3$.

3. Find by inspection the greatest factor which will divide without remainder. $x^2 + 7x + 12$ and $c^2 + 8c + 16$: also work out the least number that can be divided by them.

4. Extract the square roots of

$$a^2 + c^2 + b^2 + 2ab + 2ac + 2bc$$

and of $\frac{9}{4} - \sqrt{5}$.

5 Simplify $\left\{ \dfrac{2ab}{(a+b)^2} + \left(\dfrac{a}{a+b} \right)^2 + \dfrac{b}{a+b} \right\} \div \left\{ \dfrac{\frac{1}{2}b + \frac{1}{4}ab}{a + \dfrac{b^2}{a+2b}} \right\}$.

and prove that if $\dfrac{a}{b} = \dfrac{c}{d}$ then $\dfrac{a+b}{b} = \dfrac{c+d}{d}$.

6 . Simplify:—

   (a) $\left\{ \left(\dfrac{a^{-m}}{b^{-n}} \right)^{\frac{p}{m}} \right\}^{\frac{q}{n}}$

   (b) $\dfrac{3}{16} - 6\sqrt[3]{\frac{1}{4}} + 2\sqrt[3]{54} - 4\sqrt[3]{\frac{1}{32}}$

   (c) $\dfrac{8 - 16\sqrt{2}}{2\sqrt{2} - \sqrt{3}}$.

   (d) $\dfrac{1}{x - \sqrt{x^2 - 1}} + \dfrac{1}{x + \sqrt{x^2 + 1}}$

7. Solve the following equations :—

   (a) $\dfrac{x}{2} - \dfrac{5x+4}{3} = 7 - \dfrac{8x-2}{3}$.

(b) $\dfrac{m}{x} + \dfrac{n}{y} = a \quad \cdots \quad (1).$

$\dfrac{n}{x} + \dfrac{m}{y} = b \quad \cdots \quad \cdots (2).$

(c) $\sqrt{a-x} = \dfrac{a}{\sqrt{a-x}} - x.$

(d) $\begin{cases} x^2 + xy = a^2 + ab \\ y^2 + yx = b^2 + ab. \end{cases}$

8. Two vessels, A and B, contain each a mixture of lime and sand, A in the ratio of 2 : 3, B in that of 3 : 7. What quantity must be taken from each to form a mixture which shall consist of 10 cubic feet of lime and 22 cubic feet of sand ?

9. A, B and C together perform a piece of work in a certain time ; A alone could have done it in 6 hours more, B alone in 15 hours more, and C alone in twice the time. How long did it occupy them ?

III.

1. Simplify

$\dfrac{(a+b)(b+c) - (c+d)(d+a) - (a+c)(b-d)}{b+d}.$

Multiply together $x^2 - x + 1,\ x^2 + x + 1,\ x^4 - x^2 + 1.$

2. Find the greatest common measure of $x^5 - y^5$ and $x^2 - y^2$. Find the least common multiple of $x^2 - 4a^2,\ x^3 + 2ax^2 + 4a^2x - 8a^3.$

3. Extract the square root of

$25x^4 - 30ax^3 + 49a^2x^2 - 24a^3x + 16a^4$

4   Solve the following equations : —

(a) $\dfrac{1}{2}\left(x - \dfrac{a}{3}\right) - \dfrac{1}{3}\left(x - \dfrac{a}{4}\right) + \dfrac{1}{4}\left(x - \dfrac{a}{5}\right) = 0.$

(b) $3y - 7x = 4$
$2y + 5x = 22.$

5.   A person after paying a poor rate and also an income-tax of 7d. in the pound has 486 pound remaining; the poor rate amounts to £22 10s. more than the income-tax ; find (a) the original income (b) the number of pence per pound in the poor rate.

IV.

1.   Find the value of $\dfrac{a + \sqrt{a^2 + b^2}}{a^3 - 2b(a^2 - b^2)}$ when $a = -4$, $b = -3$

Add together $a^2 - 3ab - \dfrac{19}{21}b^2$, $2b^2 - \dfrac{2}{3}b^3 + c^2$, ab

$\dfrac{1}{3}b^2 + b^4$, and $2ab - \dfrac{1}{3}b^3$.

2.   Multiply

(i) $x^2 - \frac{1}{4}x + \frac{2}{3}$ by $\frac{1}{3}x + 2.$

(ii) $x + 2y^{\frac{1}{2}} + 3z^{\frac{1}{3}}$ by $x - 2y^{\frac{1}{2}} + 3z^{\frac{1}{3}}.$

(iii) $x^{2-2m}b^{2p+1}c^3$ by $a^{5m-2}b^{-2}c^{-1}.$

3.   Divide

(i) $m^2 + 2mp - n^2 - 2nq + p^2 - q^2$ by $m - n + p - q.$

(ii) $1 + 2n$ by $1 - 3n$ to 4 terms in the quotient.

(iii) $a - b$ by $\sqrt[4]{a} - \sqrt[4]{b}.$

4. (i) Find the G. C. M. of $6x^5-4x^4-11x^3-3x^2-3x-1$ and
$4x^4+2x^3-18x^2+3x-5$.

(ii) Find the L. C. M. of $2x-1$, $4x^2-1$, $4x^2+1$.

5. (i) Find the value of $\dfrac{x}{2} - \left\{ \dfrac{2x-3}{3} - \dfrac{3x-1}{4} \right\} \div \dfrac{x-1}{2}$

in its simplest form when $x = 4\frac{1}{4}$.

(ii) Find the value of $ax + by$ when $x = \dfrac{cq-br}{aq-bf}$ and

$y = \dfrac{ar-cp}{aq-bp}$.

6. Solve the following equations:—

(i) $3\frac{1}{5} \left\{ 28 - \left(\dfrac{x}{8} + 2\frac{1}{4} \right) \right\} = 3\frac{1}{2} \left\{ 2\frac{1}{3} + \dfrac{x}{4} \right\}$.

(ii) $a + x + \sqrt{a^2 + x^2} = b$.

(iii) $\dfrac{x+2}{7} + \dfrac{y-x}{4} = 2x-8$, $\dfrac{2y-3x}{3} + 2y = 3x + 4$.

(iv) $\dfrac{m}{x} + \dfrac{n}{y} = a$, $\dfrac{n}{x} + \dfrac{m}{y} = b$.

7. Simplify the following surds :—

(i) $2\sqrt{\frac{5}{3}} + \sqrt{60} - \sqrt{15} + \sqrt{\frac{3}{5}}$.

(ii) $\dfrac{8-5\sqrt{2}}{3-2\sqrt{2}}$.

(iii) $\dfrac{\sqrt{1-x} + \dfrac{1}{\sqrt{1+x}}}{1 + \dfrac{1}{\sqrt{1-x^2}}}$.

8. A certain fraction becomes $\frac{1}{5}$ if 1 be added to its numerator; but if 1 be added to its denominator, it becomes $\frac{1}{4}$, what is the fraction ?

9. A gentleman sends a lad into the market to buy a shilling's worth of oranges. The lad eats two. The gentleman pays at the rate of one penney for 15 more than the market price. How many did the gentleman get for his shillings ?

V.

1. Find the value of

   $\sqrt{\frac{1}{4}-x} + \sqrt{2x} - \frac{3}{2}\sqrt{1-4x}$ when $x = \frac{1}{12}$.

   Subtract $x(x^2-xy+3y^2)+y(2x^2+3xy-2y^2)$ from $x^3 + x^2y-3xy^2+2y^3$.

2. Find the expansion of $(a^2-2ab+3b^2)^2$ and the square root of $x^4-8x^3y+24x^2y^2-32xy^3+16y^4$.

3. Find the G. C. M. of x^3-8x+3 and x^6+3^5+x+3, and the L. C. M. of $4(a^3-ab^2)$, $12(ab^2+b^3)$, $8(a^3-a^2b)$.

4. Multiply $\dfrac{x^2-9x+20}{x^2-6x}$ by $\dfrac{x^2-13x+42}{x^2-5x}$

5. Simplify (i) $\dfrac{1\frac{4}{5} - \frac{3}{4}(x+2)}{\frac{3}{10}(x+1)}$.

   (ii) $\left\{ \sqrt{\dfrac{-1}{a}\sqrt{\overline{a^3\sqrt{a^{-4}}}}} \right\}$.

6. Reduce to their simplest form

   $\sqrt{45}$, $3\sqrt{432}$, $3\sqrt[8]{432}$, $3\sqrt[4]{\frac{2}{3}}$.

7. Find the square root of $41-24\sqrt{2}$ and the fourth root of $17+12\sqrt{2}$.

8. Solve (i) $\frac{1}{2}(x-a)-\frac{1}{4}(2x-3b)-\frac{1}{3}(a-x)=0$.

   (ii) $16x+11y=86$, $71y-14x=86$.

9. A packet sailing from Dover with a fair wind, arrives at Calais in two hours; on its return, the wind being contrary, it proceeds six miles an hour slower than it went. When it is half way over, the wind changing, it sails two miles an hour faster and reaches Dover sooner than it would have done, had not the wind changed, in the proportion of $6:7$. Required the distance between Dover and Calais.

VI.

1. Find the sum of

$$7a^3 - 3b^2 + 4c - d, -15a^3 + 14b^2 + 16c, 14a^3 + 10b^2 - 4d, 3c -$$

$$4ad, -9b^2 + 4a^3 - c,$$

and the quotient of $(a+b)^5 + c^5$ by $a+b+c$.

2. Multiply $a^4 - 2a^3b + 3a^2b^2 - 2ab^3 + b^4$ by $a^2 + 2ab + b^2$,

and $x + 2y^{\frac{1}{3}} + 3z^{\frac{1}{3}}$ by $x - 2y^{\frac{1}{3}} + 3z^{\frac{1}{3}}$,

3. Resolve into elementary factors

$$a^3 + a^2x + a^2b^2 + ab^2x$$

and $3a^4 - 10a^3b - 8a^2b^2$.

4 Find the Greatest Common Measure of

$$2x^4 + x^3 - 20x^2 - 7x + 24$$

and $2x^4 + 3x^3 - 13x^2 - 7x + 15$,

and the Least Common Multiple of

$$24(a^2 - b^2)axy, \ 12(ab^2 + b^5), \ 18(a^3 - a^2b).$$

5 Find the value of

(a) $\quad \dfrac{x}{a+b} + \dfrac{a^3 + a^2b}{xy} - \left(\dfrac{x^2y + a^2(a+b)^2}{axy + bxy} \right).$

(b) $\quad \dfrac{x^{\frac{1}{3}} + x^{\frac{2}{3}} - 3xy^{\frac{1}{3}} + y}{\dfrac{3x^2}{y}\left(\dfrac{x^{\frac{1}{3}}}{y^{\frac{1}{3}}} + 3y \right)} \times 245x^2.$

when $x = 4$, and $y = 27$.

6. Solve the following equations :—

(a) $\quad 3x^3 + 4(x-y)^2 - 8(\frac{2}{3}x^3 + 4) = -16.$

(b) $\quad 27x - 4(x-9) + \frac{1}{4}(10x + \frac{3}{4}) = \frac{5}{8}(x+2) + 114\frac{1}{12}.$

(c) $\dfrac{x}{y}\left(\dfrac{n}{a}+\dfrac{m}{b}\right)=\dfrac{a}{b}.$

$y^2(m+a)=\dfrac{x}{a}+my^2.$

7. A merchant bought a certain number of yards of cloth for Rs. 125, which he sold at Rs. 3 per yard, and gained as much as 10 yards cost him. How many yards did he buy?

8. Find the cube of a^2-ab+b^2

and the cube root of $1-3x+6x^2-7x^3+6x^4-3x^5+x^6$

9. A does $\frac{3}{4}$ of a piece of work in 6 days when B comes to help him; they work at it together for $\frac{1}{5}$ of a day, and then B by himself just finished it by the end of the day. In what time could they have each done it separately?

VII.

1. Reduce to its simplest form the expression

$$\frac{(1-a^2)(1-b^2)(1-c^2)-(a+bc)(b+ac)(c+ab)}{1-a^2-b^2-c^2-2abc}.$$

If $\dfrac{a_1}{b_1},\dfrac{a_2}{b_2},\ldots\ldots\dfrac{a}{b^n}$ be n fractions equal to one another,

show that any one of these fractions is equal to

$$\frac{a_1+a_2+a_3+\ldots\ldots+a_n}{b_1+b_2+b_3+\ldots\ldots+b_n}.$$

2. Simplify $\dfrac{1}{x+\dfrac{1}{1+\dfrac{x+1}{3-x}}}.$

3. Extract the square root of $16+6\sqrt{7}.$

4. Solve $\dfrac{4x^3+4x^2+8x+1}{2x^2+2x+3} = \dfrac{2x^2+2x+1}{x+1}$.

5. A ship sails with a supply of biscuits for 60 days at a daily allowance of 1℔. per head: after being at sea 20 days, she encounters a storm in, which 5 men are washed over-board, and damage sustained that will cause a delay of 24 days, and it is found that each man's allowance must be reduced to $\frac{3}{7}$℔. Find the original number of the crew.

VIII.

1. Simplify $2a-3(b-c)-2\{a-2(b-c)\}$; and find the value

of $\dfrac{a^2-ab}{a^2+b^2} + \sqrt{a^3+b^3-3a^2b+1}$

when $a=2$, $b=-2$.

2. Divide $9x^5-x^3-12x^2-50$ by $3x^2-2x+5$.

3. Simplify the expressions :—

(1) $\left(1+\dfrac{a}{b}\right) \times \left(1-\dfrac{b}{a}\right) - \left(a-b\right)^2$.

(2) $\dfrac{x-y}{x+y} + \dfrac{2y}{x-y} - \dfrac{3y^2}{x^2+xy}$

(3) $a^{\frac{2}{3}}\left(b^{\frac{1}{2}}c^{-2}\right)^{\frac{1}{2}} \div a^{\frac{1}{3}}b^{\frac{1}{4}}c$.

4. Extract the square root of

$4x^2-12xy+9y^2+12x-18y+9$.

5. Find the Greatest Common Measure of

$8x^3+x-1$ and $4x^3-3x+1$, and the least common multiple of x^3-1 and x^3-2x^2-3x.

6. Solve the following equations :—

    (1) $x - \dfrac{x-4}{2} - \dfrac{x}{3} = \dfrac{x-1}{3} - \dfrac{x-2}{4} + \dfrac{x-3}{5}$.

    (2) $\begin{cases} \dfrac{2x-3}{4} - \dfrac{y-8}{5} = \dfrac{y+3}{4} \; ; \\ \dfrac{x-7}{3} + \dfrac{4y+1}{11} = 3. \end{cases}$

7. A and B begin business with equal sums of money. At the end of a year A has gained fifty pounds and B has lost a third of his capital. It is then found that A has twice as much as B. How much had each at first ?

IX.

1 Simplify the expression

    $2a - 3(b-c) + \{a - 2(b-c)\} - 2\{a - 3(b-c)\}$.

2. Multiply $a^4 - 3a^2 b^2 + b^4$ by $a^2 - ab + b^2$, and divide
    $2x^5 - x^4 y - 4x^3 y^2 + 5x^2 y^3 - 4y^5$ by $x^3 - xy^2 + 2y^3$.

3. Extract the square root of
    $9a^4 - 42a^3 b + 43a^2 b^2 + 14ab^3 + b^4$.

4. Find the Greatest Common Measure of
    $5x^3 + 9x^2 y - 12xy^2 + 2y^3$ and $10x^3 - 7x^2 y + 6xy^2 - y^3$.

5. Simplify the expressions :—

    (1) $\dfrac{a}{a-b} - \dfrac{b}{a+b} - \dfrac{2b^2}{a^2 - b^2}$.

    (2) $\dfrac{(a+b)^2}{a-b} \div \dfrac{ab+b^2}{a^2 - ab}$.

6. Solve the equations :—

    (1) $\dfrac{3}{2}(x-1) - \dfrac{2}{3}(x+2) + \dfrac{1}{4}(x-3) = 1$.

    (2) $\left. \begin{aligned} \dfrac{3x-2y}{5} - \dfrac{x-y}{2} &= 1 \\ \dfrac{x}{3} + \dfrac{y}{4} &= 4. \end{aligned} \right\}$

7. A, having three times as much money as B, gave B $2l$; and then he had twice as much as B had. How much had each at first?

X.

1. Divide $8x^5 - x^2y^3 + \frac{1}{2}y^5$ by $2x + y$,

    and multiply $5x^3 - 3xy + 5x^2y^2 - 3y^3$ by $5x^{\frac{2}{3}} + 3y$.

2. Find the greatest common measure of

    $3x^3 - 4x^2 - x - 14$ and $6x^3 - 11x^2 - 10x + 7$; and the least common multiple of $x^2 - 4$, $x^2 - 5x + 6$ and $x^3 - 8$.

3. Simplify :—

    (1) $\dfrac{1}{a+b} + \dfrac{b}{a^2 - b^2} - \dfrac{ab^4}{a^6 - b^6}$.

    (2) $\dfrac{1 + \sqrt{1 - 2x}}{1 - \sqrt{1 - 2x}} + \dfrac{x - \sqrt{1 - 2x}}{x}$.

    (3) $a \dfrac{1}{b + \dfrac{1}{a + \dfrac{ab}{a - b}}}$.

4. Extract the square root of $4a^4 - 12a^3 + 29a^2 - 30a + 25$, and of $55 - 7\sqrt{24}$.

5. Solve the equations :—

    (1) $\dfrac{2x - 1}{3} - \dfrac{x + 4}{9} = \dfrac{5x - 1}{12}$.

    (2) $\dfrac{x + y}{7} - \dfrac{2y - x}{3} = 3$,

    $\dfrac{3y + 2x}{4} + \dfrac{9(x - 1)}{8} = \dfrac{x}{2}$.

6. A farmer sells a certain number of bushels of wheat at $7s.$ $6d.$ per bushel, and 200 bushels of barley at $4s.$ $6d.$ per bushel, and receives altogether as much as if he had sold both wheat and barley at the rate of $5s.$ $6d.$ per bushel. How much wheat did he sell?

7. If $a : b :: c : d :: e : f$ shew that $a : b :: a + c + e : b + d + f$.

XI.

1. State the conditions under which $a^n + b^n$ and $a^n - b^n$ are divisible by $a + b$.

    (a) Resolve $a^6 + b^6$ into its factors.

    (b) Show that $4(4^6 + 3^6)$ ends in 2 ciphers.

2. Resolve $4a^2 b^2 - (a^2 + b^2 - c^2)^2$ into 4 factors.

3. Show that $a^3 + b^3 + c^3 - 3abc$ is divisible by $a + b + c$, and

    hence resolve $x^3 + \dfrac{1}{x^3} - 18$.

4. Write down the product of $(x-a)(x-b)(x-c)$ and hence resolve

    $$x^3 - x^2 \left(\frac{a}{b} + \frac{b}{c} + \frac{c}{a} \right) + x \left(\frac{a}{c} + \frac{b}{a} + \frac{c}{b} \right) - 1.$$

5. If p divides, A and B, then it will divide $mA \pm nB$.

6. (a) If $\dfrac{a}{b} = \dfrac{c}{d}$, show that $\dfrac{a+b}{a-b} = \dfrac{c+d}{c-d}$.

    (b) If $x = \dfrac{\sqrt[3]{m+1} + \sqrt[3]{m-1}}{\sqrt[3]{m+1} - \sqrt[3]{m-1}}$, find the value of

    $x^3 - 3mx^2 + 3x - m$.

7. If $2s = a + b + c$, show that $(s-a)^2 + (s-b)^2 + (s-c)^2 + s^2$
   $= a^2 + b^2 + c^2$.

8. If $x = \sqrt[3]{a + \sqrt{a^2 + b^3}} + \sqrt[3]{a - \sqrt{a^2 + b^3}}$

   show that $x^3 + 3bx - 2a = 0$.

9. (a) If $x + y + z = 0$, prove that $x^3 + y^3 + z^3 = 3xyz$.

   (b) Simplify $\dfrac{(a-b)^4 + (b-c)^3 + (c-a)^3}{(a^2-b^2)^3 + (b^2-c^2)^3 + (c^2-a^2)^3}$.

10. Solve (i) $(4x^3 + 8x^2 + 16x - 1)^{\frac{1}{3}} - x = 3$.

    (ii) $x^2 + y^2 = 13$; $xy = 6$.

11. The length of a field is twice its breadth; another field which is 50 yds. longer and 10 yds. broader contains 6,800 square yards more than the former. Find the size of each.

MISCELLANEOUS QUESTIONS.

I.

1. Add together $9a-(5b+2c)$, $9b-(5c+2a)$, $9c-(5a+2b)$, and find the numerical value of the result when $c = 2b = 3a = \frac{3}{11}$.

2. If $a = 2$, find the numerical value of

$$a^{2a-1} + 2a^{a-1} + (2a-1)^a.$$

3. The product of two algebraical expressions is

$4a^2 b^2 + 2(3a^4 - 2b^4) - ab(5a^2 - 11b^2)$ and one of them is $3a^2 + 2ab - b^2$, find the other.

4. Find the difference between $a(b+c)^2 + b(a+c)^2 + c(a+b)^2$ and $(a+b)(a-c)(b-c) + (a-b)(a-c)(b+c) - (a-b)(b-c)$ $(a+c)$.

Divide $a-b$ by $a^{\frac{1}{4}} - b^{\frac{1}{4}}$.

5. Show that $(b+c-a)(c+a-b)(a+b-c) + a(b+c-a)^2$ $+ b(a+c-b)^2 + c(a+b-c)^2 = 4abc$.

6. Find the G. C. M. of $8x^2 + 14x - 15$, and $8x^3 + 30x^2 + 13x$ -30; and the L. C. M. of a^5, $5a^4b$, $10a^3b^2$, $10a^2b^3$, $5ab^4$, b^5.

7. Extract the fourth root of
$1 - 4x + 10x^2 - 16x^3 + 19x^4 - 16x^5 + 10x^6 - 4x^7 + x^8$.

8. If two fractions are together equal to 1, show that their difference is equal to the difference of their squares.

9. Find the value of $(a-b)(b-c) - (c-d)(d-a) + (a-c)(b-d)$ when $a = d$.

10. Resolve into elementary factors :—

  (1) $(a+b)^2-(c+d)^2+(a+c)^2-(b+d)^2$.

  (2) $x^2-y^2-z^2+2yz+x+y-z$.

  (3) $a^2-b^2-c^2+d^2-2(ad-bc)$.

  (4) $x^3+y^3+3xy-1$.

11. Find the G. C. M. of

$$x^6+x^{-2}-(x^{-6}+x^2) \text{ and } x^3+x-(x^{-2}+x^{-1}).$$

12. Reduce the following expressions to their simplest forms :—

  (i) $\dfrac{3x^2-8x+5}{x^3-4x^2+5x-2}$.   (ii) $\dfrac{x^2+(a-b)c-ab}{x^2+(a+b)c+ab}$.

  (iii) $\dfrac{e^{2x}x^3+e^{2x}-x^2-1}{e^{2x}x^2+2e^x x^2-e^{2x}-2e^x+x-1}$.

  (iv) $\dfrac{2c^3+ax^2+4a^2x-7a^3}{x^3-7ax^2+8a^2x-2a^3}$.

13. Simplify :—

$$(a+b)\,\frac{a+b-c}{2ab}+(b+c)\,\frac{b+c-a}{2bc}+(a+c)\,\frac{a+c-b}{2ac}.$$

State how the value of the expression will be affected by changing a into ma.

14. Prove that $(ay-bx)^2+(bz-cy)^2+(cx-az)^2+(ax+by+cz)^2$
$$=(a^2+b^2+c^2)(x^2+y^2+z^2).$$

Substitute $\frac{1}{2}(b+c)$ for x in the expression

$$\frac{(x-b)(x-c)}{(a-b)(a-c)}+\frac{(x-a)(x-c)}{(b-a)(b-c)}+\frac{(x-a)(x-b)}{(c-a)(c-b)}.$$

and simplify the result.

15. Divide $a^{\frac{3}{2}} + b^{\frac{3}{2}}$ by $a^{\frac{1}{2}} + b^{\frac{1}{2}}$.

16. Find the value of

$(x+y+z)(x+y-z)(c+z-y)(y+z-x)$ when $z^2 = c^2 + y^2$.

17. Multiply

$\{x^5 + a^5 - ax(x^3 + a^3)\}\{x^3 + a^3 + ax(x+a)\}$.

18. Expand $(a+x)^4$ and $(1+2x)^5$.

19. If $s = \frac{1}{2}(a+b+c)$ show that

$$(s-a)(s-b)(s-c) = s^3 - \frac{s}{2}(a^2+b^2+c^2) - abc.$$

20. Solve the following equations :—

(1) $x+1-\frac{2}{3}(6-x) = 3x-6$.

(2) $\dfrac{x+6}{4} - \dfrac{16-3x}{12} = \dfrac{25}{6}$.

(3) $3x-7y = 7,\ 11x + 5y = 87$.

(4) $\begin{cases} 3x-y+z = 17 \\ 5(x+y-2) = 2(y+z) \\ 4(x+y+z) = 3(1-x+3z). \end{cases}$

21. A carpenter agreed to work for 60 days on condition that he should receive for each day that he worked R4. 1-4 and his board, and pay 4as. 8 pies for his board each day he was idle. At the end of the term he received Rs. 49-9-4. How many days did he work ?

22. A certain number consists of two digits. The left hand digit is double of the right hand digit, and if the digits be inverted, the product of the number thus formed and the original number is 1008. Find the numbers.

A cattle dealer buys of one person 9 horses and 7 cows for Rs. 300, and of another person 6 horses and 13 cows for the same sum. What was the price of each ?

MISCELLANEOUS EXAMPLES.

II.

1. Find the value of $\{x^2 - 2xy + 4y^2\}^{\frac{1}{2}}$ in terms of a and b when $x = 9a^2 - 12ab$, and $y = 2b^2 - 6ab$.

2. Find the G. C. M. of $3x^3 - 10x^2y + 4xy^2 - 3y^3$ and $5x^2 - 19xy + 12y^2$.

3. Extract the square root of
$$\frac{x^2}{y^2} + \frac{y^2}{x^2} - \left(\frac{x}{y} + \frac{y}{x} \right) + \frac{9}{4}.$$

4. If $x = \dfrac{a+b}{c-d}$, show that the expression $(a - cx)^2 + (x^2 - 1)(b^2 - d^2)$ is a complete square.

5. Find the G. C. M. of $\dfrac{x^2}{3} + \dfrac{11x}{6} \sqrt{x+1} - x - 1$ and $x^2 - \dfrac{x}{4} - \dfrac{1}{4}$.

6. Simplify :—

   (a) $\dfrac{(1\frac{1}{2} - x) - \frac{1}{3}(x - 1\frac{1}{8})}{(1\frac{1}{2} - x) - \frac{1}{3}(x - 1\frac{1}{3})}$.

   (b) $\left\{ \left(a^{\frac{1}{4}} b^{\frac{3}{4}} c^{\frac{3}{4}} \right)^{-\frac{1}{2}} \right\}^{-6}$.

7. Prove that
$$a(a+1)(a+2)(a+3) + 1 = (a^2 + 3a + 1)^2.$$

8. If $2s = a + b + c$ shew that
$$(s-a)^2 + (s-b)^2 + (s-c)^2 + s^2 = a^2 + b^2 + c^2.$$

9. Simplify
$$\frac{(a+b+c)^2 + (b-c)^2 + (c-a)^2 + (a-b)^2}{a^2 + b^2 + c^2}.$$

10. Solve the following equations :—

(i) $1 - \dfrac{x}{2}\left(1 - \dfrac{3}{4x}\right) = \dfrac{2}{3}\left(3 - \dfrac{5c}{2}\right) + 5\dfrac{13}{40}$.

(ii) $\dfrac{x}{a} + \dfrac{y}{b} = 1, \dfrac{a}{x} + \dfrac{b}{y} = -4$.

(iii) $x + 2y + 3z = 17$.

$2x + 3y + z = 12$.

$3x + y + 2z = 13$.

11. A and B can do a piece of work together in 4 days. A works alone for two days, and then they finish it together in $2\frac{1}{3}$ days more. In what time could they have done it separately?

12. What meaning do you attach to such an expression as $a^{\frac{m}{n}}$? Prove that $a^{\frac{m}{n}} = \sqrt[n]{a^m}$ when both n and $\frac{m}{n}$ are positive integers.

13. Simplify $\dfrac{x}{(x-y)(x-z)} + \dfrac{y}{(y-z)(y-x)} + \dfrac{z}{(z-x)(z-y)}$.

14. If $2s = a + b + c$ show that

(1) $\dfrac{2bc + (b^2 + c^2 - a^2)}{2bc - (b^2 + c^2 - a^2)} = \dfrac{s(s-a)}{(s-b)(s-c)}$.

(2) $\dfrac{1}{s-a} + \dfrac{1}{s-b} + \dfrac{1}{s-c} - \dfrac{1}{s} = \dfrac{abc}{s(s-a)(s-b)(s-c)}$.

15. Find the value of

$\left(\dfrac{x-a}{x-b}\right)^{3} - \dfrac{x-2a+b}{x+a-2b}$ when $x = \dfrac{a+b}{2}$.

16. If $x + y + z = xyz$ show that

$\dfrac{x}{1-x^2} + \dfrac{y}{1-y^2} + \dfrac{z}{1-z^2} = \dfrac{4xyz}{(1-x^2)(1-y^2)(1-z^2)}$.

17. If $a : b :: c : d$ prove that

$ad^3 + bc^3 : a^3d + b^3c :: c^2b^4 + a^2d^4 . (ab + cd)ab^3$.

18. If $2s = a + b + c$ prove that

$$(s-a)^3 + (s-b)^3 + (s-c)^3 - 3(s-a)(s-b)(s-c) = \tfrac{1}{2}(a^3 + b^3 + c^3 - 3abc).$$

19 Two steamers start at the same time one from Bombay and the other from Aden and sail at uniform rates of speed so as to meet. When they meet it is found that the Bombay vessel has sailed 330 miles further than the other. She reaches Aden 4 days after the time of meeting while the other reaches Bombay in 9 days. Find the distance between Aden and Bombay supposing both vessels to have pursued the same course.

20 Solve the following equations :—

$$a_1 x + b_1 y + c_1 z = d_1$$
$$a_2 x + b_2 y + c_2 z = d_2$$
$$a_3 x + b_3 y + c_3 z = d_3.$$

and eliminate the unknowns when $d_1 = d_2 = d_3 = 0$.

21. A number has three digits, the sum of which equals 10 ; the first and third exceed the second by 4, and the first and second exceed the third by 8. Find the number.

MISCELLANEOUS EXAMPLES.

III.

1. Find the continued product of the three factors $x + a$, $x + b$, $x + c$. What will the expression thence arising become when $a = b = c$?

2. Divide $x^3 - xy + y^2$ by $x^2 - \sqrt{3xy} + y$.

3. Resolve $a^2 - b^2 - c^2 + d^2 - 2(ad - bc)$ into factors, and divide $(ay - bx)^2 - (ax + by)^2$ by $(a - b)$ ▓ $(a - b)$ ▓

4. Find the value of
$$\frac{x^5 + ax^4 - a^4x - a^5}{x^4 + 2ax^3 - 2a^2x^2 - 2a^3x + a^4} \text{ when } x = a.$$

5. Find the G. C. M. of $x^3 + 1$ and $x^3 + mx^2 + mx + 1$, and the L. C. M. of $x^3 - 6x^2 + 11x - 6$, $x^3 - 9x^2 + 26x - 24$, and $x^3 - 8x^2 + 19x - 12$.

6. Multiply $-3a^{-5} + 2a^{-4}b^{-1}$ by $-2a^{-3} - 3a^{-4}b$.

7. Divide $2x^5 y^{-3} - 5x^4 y^{-2} + 7x^3 y^{-1} - 5x^2 + 2xy$ by $x^3 y^{-3} - x^2 y^{-2} + xy^{-1}$.

8. Extract the square root of
$$x^4 - x^3 + \frac{x^2}{4} + 4x - 2 + \frac{4}{x^2}.$$

9. If $s = a + b + c$, prove that
$$(as + bc)(bs + ca)(cs + ab) = (b + c)^2 (c + a)^2 (a + b)^2.$$

10. Substitute $y + 3$ for x in $x^4 - x^3 + 2x^2 - 3$ and simplify the result.

11. Simplify $\dfrac{(a + x)(a - x) + (a + x)^2 + (a - x)^2 - (2x^2 - a^2)}{2a + x}$.

12. Solve the following equations:—

  (a) $\dfrac{x - 1}{2} + \dfrac{x - 2}{3} = \dfrac{x + 3}{4} + \dfrac{x + 4}{6} + 1.$

(b) $\dfrac{x+6}{x-1} + \dfrac{x-6}{x+1} = 2\,\dfrac{x^2-6}{x^2-1}$. (c) $\begin{cases} x+y=a \\ ax+by=ab. \end{cases}$

(d) $\dfrac{1}{z} + \dfrac{1}{y} = 1,\ \dfrac{1}{x} - \dfrac{1}{y} = \dfrac{z}{x}$, $x+y+z=2$.

13   At what time between one o'clock and two o'clock is there exactly one minute's interval between the two hands of a watch?

14.   Solve $\dfrac{2}{x} + \dfrac{1}{y} = \dfrac{3}{z}$, $\dfrac{3}{z} - \dfrac{2}{y} = 2$, $\dfrac{1}{x} + \dfrac{1}{z} = \dfrac{4}{3}$.

15.   If $3s = a+b+c$, prove that
$(s-a)^4 + (s-b)^4 + (s-c)^4 = 2\{(s-b)^2(s-c)^2 + (s-c)^2(s-a)^2 + (s-a)^2(s-b)^2\}$

16   A starts from Bombay for Poona and B at the same time from Poona for Bombay. Each travels at a uniform rate. A reaches Poona 16 hours and B reaches Bombay 36 hours after passing each other on the road. Find in what time each has performed the journey.

17.   Find the square root of $16 + 16x^{\frac{1}{2}} - 20x - 12x^{\frac{3}{2}} + 9x^2$: explain why you obtain a different result if the terms be arranged according to decreasing powers of x.

18.   Simplify :—

$$\dfrac{(ab-1)^2 + (a+b+2)(a+b+2ab)}{(ab+1)^2 - (a+b)^2}.$$

19   Prove that
$$4a^2b^2 - (a^2+b^2-c^2)^2 = s(s-2a)(s-2b)(s-2c) \text{ if } s=a+b+c.$$

20.   Find the sum and difference of

$$\left(\dfrac{x}{a} + \dfrac{a}{x} \right)\left(\dfrac{y}{b} + \dfrac{b}{y} \right) \text{ and } \left(\dfrac{x}{a} - \dfrac{a}{x} \right)\left(\dfrac{y}{b} - \dfrac{b}{y} \right).$$

21.   Prove the following equality

$$\dfrac{1}{1 + x^{m-n} + x^{m-p}} + \dfrac{1}{1 + x^{n-m} + x^{n-p}} + \dfrac{1}{1 + x^{p-m} + x^{p-n}} = 1.$$

22   Solve the following equations :—

(i) $\dfrac{5x+4}{17} - \left(2 - \dfrac{x^2}{2}\right) = 1 + \dfrac{x}{3}$.

(ii) $2x + 3y = 40, \ 5x - 12y = 61.$

23. A garrison which had provisions for 30 months, was doubled at the end of 4 months, and increased by 400 men 3 months afterwards, and the provisions were then exhausted in 15 months from the first : find the original number of men.

24   A gamester at one sitting lost $\frac{1}{2}$ of his money, and then won 10s, at a second sitting, he lost $\frac{1}{3}$ of the remainder, and then won 3s, after which he had 3 guineas left.   What had he at first ?

25. A merchant goes to three fairs in succession gaining at the first 15 per cent. on his capital : at the second 20 per cent., and at the third, 25 per cent., when he finds that he has cleared £1000. 12s. 6d. : find his capital.

26 A man has a certain number of rupees which he tries to arrange in the form of a square.   On the first attempt he has 130 over.   He then increases the side of the square by 3 rupees, and he has only 31 over.   How many rupees had he ?

27   Two pieces of cloth are bought for Rs. 44-8-0.   One is three yards longer than the other, and each cost as many half rupees the yard as it is yards in length.   What are their lengths ?

ANSWERS.

1. $42x^5 - 18x^{\frac{4}{3}}y^{\frac{1}{3}} - 9x^{\frac{4}{3}}y^{\frac{2}{3}} - 14x^{\frac{1}{3}}y^{\frac{2}{3}} + 6y - 4x^{\frac{4}{3}}y^{\frac{4}{3}} + 40x^{\frac{7}{3}}y^{\frac{1}{3}} + 14xy.$

2. $\frac{7}{4}$.

3. A can finish it in $31\frac{17}{33}$ days, B in $42\frac{14}{17}$ days. C in $101\frac{2}{7}$ days.

2. $(x^2 - xy + y^2)^2$.

3. $(x-a)(x+a)(x^2+a^2)(x^2-ax+a^2)$
$(x^2+ax+a^2)(x^4-a^2x^2+a^4)$.

4. $x + 5$.

5. (i) $x = \frac{8a}{25}$. (ii) $x = \frac{ab}{a+b-c}$.

1. 0.

2. $x^{\frac{2}{3}} + x^{\frac{1}{3}}y^{\frac{1}{3}} + y^{\frac{2}{3}}$; $\frac{-\left(x+c\right)}{(a-x)(x-b)}$; $-\frac{a^2+b^2}{a}$.

3. (1) $x = 7$. (2) $x = -\frac{5}{6}$.

4. £2. 15s.

1. $7x^2 - 7xy + 5y^2$.

2. $\frac{2a^2}{2a^2(a^4-x^4)} = \frac{1}{a^4-x^4}$.

3. $x^{\frac{3}{2}} - 2xy^{\frac{1}{2}} + 2x^{\frac{1}{2}}y - y^{\frac{3}{2}}$.

4. (1) $x = 8$. (2) $x = -\frac{3}{2}$. (3) $x = 16$. (4) $x = 1, y = 3$.

Page 3.   (V —1862).

1. $\dfrac{3(x^2 + y^2)}{x^2 - y^2}$.

2. $a^{\frac{2}{5}} + b^{\frac{2}{7}} + c^{\frac{2}{3}} + 2a^{\frac{1}{5}}c^{\frac{1}{3}} - 2a^{\frac{1}{5}}b^{\frac{1}{7}} - 2b^{\frac{1}{7}}c^{\frac{1}{3}}$; $a^{-2} - 2a^{-3}b +$

$3a^{-4}b^2 + \&c.$

4. (a) $x = 5.$ (b) $x = 16.$ (c) $x = \dfrac{c(3a - b)}{2b}$.

5. $\dfrac{2}{3}$.

Page 3.   (VI—1863).

1. $\dfrac{xy + y^2}{y(x + y)} = \dfrac{y(x + y)}{y(x + y)} - = 1.$

2. $a^7 - a^6x + a^5x^2 - a^4x^3 + a^3x^4 - a^2x^5 + ax^6 - x^7$; $x^{\frac{1}{2}} + x^{\frac{1}{3}}y^{\frac{2}{3}}$

$- x^{\frac{1}{4}}y^{\frac{4}{3}} - y.$

3. (a) $x = 5.$ (b) $x = \frac{3}{4}.$ (c) $x = 2 ; y = 3.$ 4   24 ft.

Page 4.   (VII – 1864).

1. $2(x^2 + y^2 + z^2 - xy - xz - yz).$

2. $x^{\frac{3}{2}} - 3x^{\frac{1}{2}}y^{\frac{1}{2}}z^{\frac{1}{2}} + y^{\frac{3}{2}} + z^{\frac{3}{2}}$; $(x^2 + ax + a^2)(x^4 - a^2x^2 + a^4)$ or

$x^6 + ax^5 - a^3x^3 + a^5x + a^6.$

3. $\dfrac{1}{(x-1)(x-2)(x-3)}$.

4. (a) $x = 10.$ (b) $x = 5 ; y = 11.$

Page 4. (VIII—1865).

1. $(x + y)^2 - 1$ or $x^2 + 2xy + y^2 - 1$.

$(u + x + y + z)(u - x - y + z)(x - y - z + u)(x - y + z - u)$.

2. $x^2 + 2x + 3$; $\dfrac{x-5}{x+5}$. 3. (i) 1. (ii) $\dfrac{1}{xy^2}$. (iii) 0

4. 2.

5. (i) $x = \dfrac{a^2c + ab^2 + bc^2 - (a + b + c)}{ac + bc + ab - 2}$; (ii) $x = -\dfrac{8}{25}\,a$.

(iii) $x = 4\frac{1}{2}$. (iv) $x = -\dfrac{4a^2c}{c^2 + 4b^2}$.

Page 5. (IX—1866).

1. $2x^2y^2 + 2c^2z^2 + 2y^2z^2 - x^4 - y^4 - z^4$; $x - y$, $(x + y)(y + z)$.

2. 1; $x^2 + 2x + 3$.

3. $x^2 + \dfrac{1}{x^2} - 2$. 4. (a) $x = 1$. (b) $x = 7$.

Page 6. (X—1867).

1. $\dfrac{x-1}{x+1}$; $2x + 5$. 2. $\dfrac{cy}{x^2 + y^2}$.

4. $x = 12$; $x = \frac{1}{3}(a^3 + b^2 + c^2)$.

5. $x = \dfrac{bc_1 - b_1c}{ab_1 - a_1b}$, $y = \dfrac{ac_1 - a_1c}{a_1b - ab_1}$. $x = 4$, $y = 5$, $z = 6$.

6. $x^3 + 4x - 1$; $a^2 - b^2 + c^2 - d^2$.

Page 7. (XI—1868).

1. $3\sqrt{33}$ or $34.59\ldots$; $a - b + c - d$.

2. $\dfrac{a^4 + a^2b^2 + b^4}{ab(a-b)^2}$.

3    $x = 6$; $x = 4$.

4. $x-1$; $(x-1)\,(x-2)(x+2)(x^2-x+1)$.

5. $x = y = z = 12$.   6.   23.

Page 8.   (XII—1869).

1. $x^2 - xy + y^2 + x + y + 1$; $x^2 - \tfrac{3}{2}x - \tfrac{2}{3}$.

2. $(x^2+1)^2$; $(x^2+1)^2(x+1)(x-1)$; $(c^2+1)\,c+1)(c-1)$;
      $6c^4 + 11x^2 - 3x - 2$.

3. (a) $\dfrac{4a^3 x 3}{x^4 - a^4}$.   (b) $\dfrac{3}{a+c}$.   (c) $\dfrac{3x^2 + c}{4x^2 + 2x - 1}$

4. (a) $x = 18$.   (b) $x = \dfrac{a^2 - b^2}{ma - bn}$; $y = \dfrac{a^2 - b^2}{an - bm}$.

5.   He worked for 22 days, and remained idle for 8 days

Page 8.   (XIII—1870).

1. $x^4 + x^3 y + x^2 y^2 + xy^3 + y^4$; $\dfrac{a^2}{b^2} - 1 + \dfrac{b^2}{a^2}$.

2. x^a ; $\dfrac{(2 + x^2)(1 + x^4)}{x}$.

3. $x = -\tfrac{1}{3}$; $x = \tfrac{2}{3}a$; $x = \tfrac{1}{3}$, $y = 18$.

4. $x^4 - y^4$; $\dfrac{2x^2 + 3x - 5}{7x - 5}$.

5    $2x^2 + 2ax + 1b^2$.   6.   12 o'clock ; 125 miles from A.

Page 9. (XIV—1871).

1. $2x^5 - x^4 y - \tfrac{1}{3}x^3 y^2 - \tfrac{3}{6}x^2 y^3 + y^5$; $x^2 + \dfrac{1}{x^2} - 1$.

2. $\dfrac{2c+3}{5x-2}$; $2x^2(c-2)^2(x+2)$.

3. (a) $\dfrac{2a}{a+b}$. (b) $\dfrac{x^3(1-x)}{2+x}$.

4. (i) $x=3$ (ii) $x=2\frac{1}{3}$, $y=3\frac{3}{4}$.

5. A received Rs. 630, B Rs. 810.

Page 10. (XV—1872).

1. c^2+2c-3, $3x-11$.

2. (i) $\dfrac{x^3}{x^3+a^3}$, (ii) $\dfrac{1}{xyz}$.

3. (i) $x=7\frac{1}{2}$ (ii) $x=8$, $y=5$. 4. A's share = Rs 500. B's = Rs 100. C's = Rs 200.

Page 11. (XVI—1873).

1. (i) $\sqrt{5xy}$ (ii) $x+y$. (iii) $\dfrac{2x^7}{x^4-1}$.

2. $x-2a$, $3ax(c^2-a^2)$.

3. (a) $x=-\frac{4}{5}$ (b) $x=\frac{1}{2}$ (c) $x=2\frac{1}{2}$, $y=1\frac{1}{2}$, 5. 5 miles.

Page 12. (XVII—1874).

1. (i) $\dfrac{x^{-m}}{2}$ (ii) $\dfrac{a^2+b^2}{a^2-b^2}$ (iii) $a-b$.

2. $1+4c-16x^3-32c^4+64x^9$; $3c^2-\frac{1}{3}xy+3y^2$.

3. $x=7\frac{1}{2}$; $x=-7$. 5. 84.

Page 13. (XVIII—1875).

1. $b-a-c$; $\dfrac{x^3}{y^3}-\dfrac{y^3}{x^3}$; $2x^2-x-2$. 2. $\dfrac{1}{1-x^2}$

3. (i) $x=\frac{6}{7}$ (ii) $x=\frac{2}{5}$ (iii) $x=\frac{3}{14}$, $y=\frac{5}{7}$. 5. 2080.

Page 14. (XIX—1876).

1. (i) $a + 3b + 2d$. (ii) $8c^3$. (iii) $\dfrac{4a^4}{(a^2 + b^2)^2}$.

2. $2c - 1$; $x^2 + 1 + \dfrac{1}{x^2}$; $z - c + \frac{1}{2}b^2$.

3. (i) $c = 56$ (ii) $x = 7$, $y = 9$ 5. 4 days.

Page 15. (XX—1877).

1. $\dfrac{4x^4 + 8}{1 + x^4 + x^8}$; $2a^2b^2 + 2a^2c^2 + 2b^2c^2 - a^4 - b^4 - c^4$; $x^2 - x - 19$.

2. (i) $x = 4\frac{1}{2}$ (ii) $x = \frac{5}{3}$ (iii) $x = 1$, $y = 2$, $z = 3$.

3. $x^2 - 4x + 3$.

4. $a + \dfrac{x^2}{2a} - \dfrac{x^4}{8a^3} + \dfrac{x^6}{16a^4}$; $10 \cdot 049881$.   6 10 days.

7. $\dfrac{25}{28}$ cwt., 2 cwt., 3 cwt.

Page 16. (XXI—1878).

1. $x + y + z + xyz$.   2. $ax + by + cz$.

3. 0.   4. (a) $x = -3$. (b) $x = 6$.   5. 1.

Page 16. (XXII—1879).

1. $a^{3n} + x^{3n}$; $x + \frac{1}{2}$.   2. $x^{2^{n-1}} - y^{2^{n-1}}$; 2.

3. (a) $x = -\dfrac{m(m + 2k)}{2(m + k)}$. (b) $x = y = 3$. (c) $x = 4, y = 100$.

5. In favour of the latter.   6. 11 days.

Page 18. (I—1857).

1. —120.   2. $x - \sqrt{xy} + y$.

3. (i) $x = 15$.   (ii) $x = 2, y = 5, z = 6$.

4 200 miles ; $33\frac{1}{3}$ miles per hour.

Page 18. (II—1858).

1. 59.   2. $2(a^2 + b^2 + c^2 - ab - ac - bc)$.

3. $1 + x - x^2 +$ &c.

4. $c = \dfrac{abc\,(bc - ab - ac)}{(bc - ab)(ab - ac + bc) + ac(bc - ab - ac)}$.

   $y = \dfrac{abc}{(bc - ab) + ac(bc - ab - ac)}$.

5. 48.

Page 19. (I—1859).

2. $1 - \dfrac{x}{6} + \dfrac{7x^2}{36} + \dfrac{5x^3}{216} + \dfrac{73x^4}{1296} +$ &c.

3 $(x + a)(x - a)(x^2 + ax + a^2)(x^2 - ax + a^2)$; $(x - 2)(x - 7)$.

4. (i) $x = \dfrac{a^2 - b^2}{4a - b}$. (ii) $x = \dfrac{9}{8}$, $y = \dfrac{57}{16}$, $z = -\dfrac{103}{16}$.

5 $7\frac{1}{8}$ days.

Page 20. (II—1860).

1. $x^2 - y + 5y^2$.

4. $x = \dfrac{3 + 2\sqrt{2}}{2}$, $y = \dfrac{3 - 2\sqrt{2}}{2}$.

5 Shem survived Abram 35 years.

[Page 20. (III—1861).

1. $6x^6y + 39x^5y^2 - 69x^4y^3 - 54x^3y^4 + 69x^2y^5 + 15xy^6$.

2. $1\frac{1}{4}b$.

3. $(x^2 - a^2)^2$ or $x^4 - 2x^2a^2 + a^4$; $x^{\frac{4}{9}}y^{\frac{3}{4}}z^{\frac{4}{4}}$.

4. $(a + x)^3 (a - x)$.   5. $\frac{1}{2}a - \frac{1}{4}b$.

6. $\frac{4ab}{a \cdot b^2}$, (i) ∞ (ii) ∞ (iii) $\frac{4(2 + \sqrt{5})}{(8 + 4\sqrt{5})}$.   (iv) 0

7. 52.   8. 5 sovereigns, 2 shillings.

9. (i) $x = 1$.   (ii) $x = \frac{4abc}{ab + bc + ac}$.   (iii) $x = abc$.   (iv) $c = 3\frac{1}{2}$

Page 22. (IV—1862).

1. $a^3 + a^2 + 2ab + b^2 + 3a^2b + 3ab^2 + b^3 + a + b$.

    $(a + b)^3 + (a + b)^2 + (a + b)$.

2. $a^2x^2 + 3bx + c$; $a^4x^4 + 6a^2bx^3 + x^2(9b^2 + 2a^2c) + 6bcx + c^2$.

3. 1 ; 0 ; 2.   4. 1 ; $2a - x^2$, $(2a - x^2)^{\frac{1}{4}}$, $a^{\frac{1}{4}}$.

5. $4mx + 6xy + 3pr$.

6. (i) $x = -3$ or 7.   (ii) $x = \frac{a}{b} + \frac{b}{c} + \frac{c}{a}$,(iii) $x = 1\frac{1}{2}, y = 7\frac{1}{4}$.

7. 132 miles C from A, 108 miles C from B ; $5\frac{1}{2}$ hours (A).
    6 hrs. (B).

8. (A) 21 pheasants, 35 partridges, (B) 25 pheasants. 45
    partridges.

Page 23. (V—1863).

1. $-(a^2 + b^2 + c^2)$.   2. (i) $x^4 + 9x^2 + 81$.   (ii) $q^{a^3} + $
                                             $2ab^{\frac{1}{2}} + 2a^{\frac{1}{2}}b + b^{\frac{3}{2}}$.

3   (i) $x^2 + 3c + 2$. (ii) $a^{-2} - a^{-1}b^{-1} + b^{-2}$.

4. (i) $x^3 - 2x + 7$. (ii) $\sqrt{a} + \sqrt{b} - \sqrt{c}$.

5   $a^3 + b^3 - 3b^2c + 3bc^2 - c^3 + 3a^2b + 3ab^2 - 6abc - 3a^2c + 3ac^2$.

6. (i) $x = 1$, (ii) $x = \dfrac{a^2c + ab^2 + bc^2 - a - b - c}{ac + ab + bc - 1}$.

(iii) $x = \dfrac{c_1 - c_1 b}{ab_1 - a_1 b}$ (iv) $x = 4$.

$y = \dfrac{a_1 c - ac_1}{a_1 b - ab_1}$. $y = 1$.

(v) $x = \frac{1}{2}$, $y = 1$, $z = \frac{1}{3}$.

7 Rs. 3640.   8. $\frac{5}{9}$.

Page 24.   (VI—1864).

1. (i) 2. (ii) 2.   2. 9.

3 $a^{-5} - 6a^{-4}b + 13a^{-3}b^2 - 13a^{-2}b^3 + 6a^{-1}b^4 - b^5$.

4 $(a-b)x - (a+b)y$.   5. $a + 2\sqrt{b} - 3\sqrt[3]{c}$.

6. $a - 2b$.

7. (i) $\dfrac{x-3}{x+3}$. (ii) $\dfrac{4a^3}{a^4 - x^4}$.   (iii) 1.

8 (i) $x = -\dfrac{\sqrt{a}}{3}$. (ii) $x = a, y = b$. (iii) $x = 2\frac{4}{5}$, $y = 1\frac{2}{7}$ $z = \frac{5}{3}$.

9. 13.

Page 25.   (VII—1865).

1 $x^4 + 9x^2 + 81$.

2 (i) $-\dfrac{x^2}{(x-a)n}$. (ii) $-\dfrac{2c}{c-a}$ or $-\dfrac{2c}{a-c}$.

3. (i) $(b-a)(b+c+a)(b-c+a)$. (ii) $(a+b)(c-a+b)(c+a-b)$.

4. 1.   6. $(x^2 + 4x + 9)(x^2 - x - 12)(x-4)(x+3)(x+1)$.

7. (i) $x = -\frac{1}{4}$. (ii) $x = 72$. (iii) $x = \dfrac{b+c}{2a}$, $y = \dfrac{a+c}{2b}$, $z = \dfrac{a+b}{2c}$.

8 B can do in 40 days, A in 32 days.

Page 26. (VIII—1865).

2. (i) $2x^2 - 3ax + 2a^2$ (ii) $4x^{\frac{2}{3}} - 2x^{\frac{1}{3}}y^{\frac{1}{3}} + y^{\frac{2}{3}}$.

3. (i) $a - 1 + \dfrac{1}{a}$ (ii) $a^{-2} + a^{-1}b^{-1} - b^{-2}$.

4. $x + 2$. 5. $(4x^2 - 1)(x - 1)(3x - 2)$.

7. (i) $\dfrac{3a^2 + 2b^2}{10a^2 + 15ab}$. (ii) $\dfrac{2\sqrt{a^2 - x^2}}{x^2}$.

8. (i) $x = 10$. (ii) $x = 1$. (iii) $x = 9$. (iv) $x = 2, y = 5, z = 10$.

9. $\dfrac{m(2m + n)}{2(m^2 - n^2)}$ miles.

Page 28. (IX—1866).

$\dfrac{2(x^4 + 1)}{x^6 - 1}$ 2. $(a + b)x^3 + (b + c)x^2 + (a + c)$

3. $a^2 + \dfrac{1}{a^2} + a - \dfrac{1}{a^2}$. 4. $x^2 - x + 1$.

7. (i) $x = 1$. (ii) $x = 8, y = 4, z = 5$.

Page 29. (X—1867)

1. $a^3 + (m + n)a^2 + 2mna + 1$. 2. $2(a + m)(c + n) + 2bd$.

3. (i) $\dfrac{3abc}{a + b}$ (ii) $a + b$. 4. $x^2 - x + 1$.

6. $(x - 1)^2 (x + 1)(x - 3)(2x + 5)(x^2 + 5)$.

7. (a) $x = 4$. (b) $x = \dfrac{abc}{a + b + c}$. (c) $x = \dfrac{1}{a + b + c}$,

$y = \dfrac{2}{a + b + c}$, $z = \dfrac{3}{a + b + c}$.

8. (i) $c + \dfrac{b(a - c)}{2b - a + bn - an}$, (ii) $\dfrac{cn(a - b) + a(c - b)}{(n + 1)(a - b)}$,

Page 30. (XI—1868).

1. $c-b$.

2. (1) $(x^2+x+1)(x^2-x+1)$.

 (2) $(a-b)(a^2c-c^3-a^2b-ab^2)$.

4 (i) $\dfrac{1}{x^2-x+1}$. (ii) 4.

5. $x-1$.

7. (i) $x=\tfrac{1}{5}$. (ii) $x=\dfrac{a}{a-b}$, $y=\dfrac{b}{a+b}$. (iii) $x=16$, $y=36$.

8. Length $=18$ ft. Breadth $=12$ ft. Height $=15$ ft.

Page 31. (XII—1869).

1 $1-a^2$.

2. $x^8+ax^7-a^2v^5-a^4x^4-a^3r^3+a^2x+a^8$.

3. $(b^2-c^2)(4b^2+a^2+c^2-2ab)$.

4. (i) 1. (ii) $\dfrac{2}{(x+2)(x+3)}$.

5. $(b-c)^2(a-d)^2$; $(b-c)(a-d)$.

9. (i) $x=14$. (ii) $x=\dfrac{1}{1-a}$. (iii) $x=bc(b-c)$.

 $y=ac(c-a)$. $z=ab(a-b)$

10. 10 miles an hour.

Page 33. (XIII—1871).

1. (i) $a+b+c$. (ii) $\dfrac{b}{a}$.

2. (i) 1. (ii) $\dfrac{2x^6}{x^6-1}$. (iii) $\dfrac{x}{(c+bx)(d+c-x)}$

4 $x - \dfrac{1}{x+2}$. 6. $x^4 + 2x^3 - 1$.

8. (i) $x = 1$. (ii) $x = \dfrac{21a(a^2+b^2)}{(3a+7b)(a^2-b^2)}$, $y = \dfrac{21b(a^2+b^2)}{(3a+7b)(a^2-b^2)}$.

(iii) $x = y = z = 1$.

9 A's money $= 12s.$, B's $= £1. 8s.$

Page 35. (XIV—1873).

1 $(a+b)(a+b+c)$; $(a+b)(a-b)$ or $a^2 - b^2$.

4 $a^2 - 2a + 2$.

5 (i) 4. (ii) $\dfrac{4}{(x+1)(5x+1)}$.

6 $(a+b)^2(c-d)^2$ or $\{(a+b)(c-d)\}^2$.

9. (i) $x = 7$. (ii) $x = \dfrac{ab}{an^2+bm^2}$ (iii) $x = y = z = \dfrac{n+b}{c}$.

10 $2\frac{1}{2}$ miles.

Page 36. (XV—1874).

1. $\dfrac{a^2}{b^2} + \dfrac{b^2}{c^2} + \dfrac{c^2}{a^2} - \dfrac{a}{c} - \dfrac{c}{b} - \dfrac{b}{a}$.

2. $a^{2n} - a^{2n-1}b + a^{2n-2}b^2 - a^{3n-3}b^3 + a^{4n-4}b^4 - \&c.$

$a^{2n} + a^{2n-1}b + a^{2n-2}b^2 + a^{3n-3}b^3 + a^{4n-4}b^4 - \&c.$

$a^8 + a^6 + a^4 + a^2 + 1.$

3 $2(a-b)(b-c)(c-a)$; 2. 4. $a^2 - 3a + 5$.

5. (i) 3 (ii) $2(ac+bd)(ad+bc)$. 7. $(a-b)(ab+1)$.

9. (i) $x = 2$. (ii) $x = \dfrac{10(2+\sqrt{6})}{3}$. (iii) $x = \dfrac{4(a-1)}{a-2}$,

$y = \dfrac{a+1}{a-2}$, $z = \dfrac{3a-1}{a-2}$. 10. 3 miles.

Page 38. (XVI—1875).

1. $2(a-b)$. 2. 0.

3. $b^2-a^2+8ab+6a^2b^2+6ab\sqrt{(1-a^2)(1-b^2)}+b\sqrt{1-a^2}$

5. $\dfrac{10a^6+5a^3+12}{12a^5+5a^2+10}$. $-a\sqrt{1-a^2}$.

6. $(a^3-a^2+1)(a^5+a^4+1)$.

7. (i) $\sqrt{a+x}$. (ii) $\dfrac{16ab^2c}{\{b^2-(a-c)^2\}^4}$.

8. $16abx^2+4(a-b)^2x^2$.

9. (i) $x=\frac{3}{2}$. (ii) $x=\dfrac{ab}{a+b}$. (iii) $x=1$. $y=2$.

10. $3\frac{1}{2}$ miles.

Page 39. (XVII—1877).

1. $4(a-b)^2(a+b+1)$. 2. $a+b+c$.

3. x^2-3x-2; $x^2-\dfrac{x}{2}+\dfrac{2}{x}$.

4. $x=\sqrt{5}$. 5. 60 years.

Page 40. (XVIII—1878).

1. 2. 2. $(x^3-3x-1)^2$.

4. (i) $x=-2$. (ii) $x=b-c$, $y=c-a$, $z=a-b$.

5. 30 miles ; 6 miles.

Page 42. (I—1862).

1. $a^0=1$.

3. $\dfrac{x^3}{3}+\dfrac{11x^2}{6}-\dfrac{7x}{9}+\dfrac{4}{3}$; (i) $x^2+6x-3-\dfrac{18x+4}{x^2+3}$.

(ii) $\dfrac{a^2-b^2}{a^2-c^2}$. (iii) $\dfrac{a^2}{y^2+2y^2}$.

4   84 years.   5. $(v \pm y)^2$.   6.   32 and 24.

7. $-\dfrac{(a^2-a+1)(a-2)}{a^2+3a+1}$.

8   (i) $(5ax-2y)(5ac+2y)$.   (ii) $(x+y)(x^2-xy+y^2)$.

(iii) $(x-y)(x^2+x_1+y^2)$.

9   (a) $16\frac{4}{11}$ min.   (b) $49\frac{1}{17}$ min.

10    $x = -\dfrac{20}{43}$, $y = -\dfrac{11}{43}$, $z = -\dfrac{1}{43}$.

Page 43.   (II—1863).

1. $7\frac{1}{2}$.

2. $\dfrac{bcx + acy + abz - bcyz - acxz}{abc}$

$\dfrac{-abxy + a^2bcx + ab^2cy + abc^2 +}{abc}$

$\dfrac{+ab + ac + bc}{abc}$.

3    $a-b$.   4. $(a^3-1)(a^2+5a+1)$

5. $\dfrac{a^2-c^2}{a}$; $4x\sqrt{x^2-1}$.

7. $a^{\frac{2}{3}}-b^{\frac{2}{3}}+c^{\frac{2}{3}}$.

8   (a) $x=11$.   (b) $x=\frac{1}{6}$, $y=\frac{1}{4}$.   (c) $x=\frac{3}{4}$.

9    $1\frac{7}{8}$ hrs.   10.   12.

Page 45.   (III—1864).

2. $-\dfrac{47}{12}$.   3. $2b(x+4)$.

4.   0; a^b-b^b.   5. a^2-x^2.

6. (i) 0. (ii) $\dfrac{a+bx}{b+ax}$. 8. (1) $x = \frac{1}{3}$. (2) $x = \dfrac{n^2-m^2}{am-bn}$,

$$y = \dfrac{n^2-m^2}{an-bm}.$$

9 6. 10 2 days, 8 days.

Page 46. (IV—1865).

1. $3(a-2c)$. 2. (i) 9. (ii) 9.

3. $a^6-22a^4+60a^3-55a^2+12a+4$

4. $(x-1)^2$.

5. $\dfrac{1}{abc}$; $\dfrac{x^4}{a^4} + \dfrac{x^2}{a^2} + 1$.

6. $1 + \frac{1}{2}x - \frac{1}{8}x^2 + \&c.$

7. $a + a^{\frac{1}{2}}b^{\frac{1}{2}} - b$.

8. (i) $c = 1$. (ii) $x = 16$. (iii) $x = \dfrac{a^2-b^2}{6a}$.

9. 30 hours.

10. 72 miles.

Page 47. (V—1866).

1. 536. 3. $3a^2+4ab+b^2$.

5. $x+2$. 6. $\dfrac{4}{3(x+1)}$.

7. (i) $2x^2-x+1$. (ii) $x^2 - \dfrac{x}{2} + \dfrac{2}{x}$.

9. (i) $x = 1$. (ii) $x = \dfrac{1254}{203}$, $y = \dfrac{2444}{203}$.

10. Cost of tea per ℔. 5s., cost of sugar per ℔. 4d.

11 100 miles.

Page 49. (VI—1867).

1. (i) 6,   (ii) 60.

2. $x^2 - 2x^{\frac{3}{2}}y^{\frac{1}{2}} + 2xy - 2x^{\frac{1}{2}}v^{\frac{3}{2}} + y^2$.

3. $x^3 - xy^2 + y^3$.

5. (i) $\dfrac{3 + 32y}{4(x^2 - y^2)}$.   (ii) $-\dfrac{5}{4x + 2}$

6. 1.

7. $-\dfrac{2}{a - b}$.

8. (i) $x = 4$.   (ii) $x = 3$.   (iii) $x = 6$, $y = 10$

9. $16\frac{4}{11}$ min. after together ; $49\frac{1}{11}$ min. after in opposite direction. $32\frac{8}{11}$ min. after at right angles.

10. Rs. 1500, Rs. 500.

11. $3\frac{6}{13}$ miles from Bassein.

Page 50. (VII – 1868).

2. $7x^2 - y^2 - 2xy$.

3. $a^4 - 2a^2b + 4ab^2 - 8b^3$.

4. $(a + 2b - c - 3d)(a - 2b + c - 3d)$.

5. $2a^2x(2a - 3x)$.

6. $(2b^2 - 1)(a - b)$.

7. $x^3 - 2x^2y - y^2$.

8. (i) $x = 9$.   (ii) $x = 16$.

9. 56, 203.

Page 51. (VIII—1869).

1. $-5\frac{1}{2}$.

3. $a^{mn} - a^n b^{(n-1)/m} - a^{(m-1)/n} b^m + b^{mn}$.

4. $6(x^3 + 2x^2y - 7xy^2 + 4y^3)(x^3 - xy^2 + 2y^3)(x - y)$.

5. $\dfrac{x + y}{2}$.

7. $x^{\frac{2}{3}} + 3x^{\frac{1}{3}}y^{\frac{1}{3}} - 2y^{\frac{1}{3}}$.

8. (i) $x = 18$. (ii) $x = -\frac{4}{5}$. (iii) $x = 1$, $y = 1\frac{1}{4}$.

9. 1000 men.   10. $13\frac{1}{2}$ miles ; 9 miles per hour.

Page 52   (IX—1872).

2. 34 5.   3. $u^{n+2} - a^2 - a + 1$.

4. (i) $\dfrac{x^2 - 1}{y}$. (ii) $\dfrac{1 - a - a^2}{(1 - a)^3}$.

5. $x + 1$; $120xy(x^2 - y^2)$ 6. $2x^2 + 3xy + y^2$.

7. (i) $x = 41$. (ii) $x = 11$, $y = 9$. 8. 70 and 30.

9. 91.

Page 53.   (X—1873)

2. (i) $\dfrac{x^2 + y^2}{x^2 - y^2}$. (ii) $\dfrac{8x^3 + 5x^2 + 11x + 1}{(4x + 1)(x - 1)}$.

3. $a^2 x(x - a)$; $42(x^3 - a^3)(x + a)$.

4. $x^3 - 2x^2 + 3x - 4$; $2x + 5y$.

5. $x = 26$, $y = 27$.   6. 17 miles ; 4 hours

7. $am + bn + cp$.

8. $x = 2\frac{6}{11}$, $y = -\frac{30}{333}$, $z = -\frac{60}{413}$. 9. 324.

Page 55.   (XI—1874).

2. $a + a^{\frac{3}{2}}b - b - a^{\frac{3}{2}}b^2 - a^{\frac{1}{2}}b^{\frac{3}{2}} + a^{\frac{1}{2}}b^2 - b^2$; $x^{\frac{1}{2}} + 2x^{\frac{1}{3}} + x^{\frac{1}{6}}$.

3. $a - b$; $\dfrac{3a^2 + b^2}{4a + 3b}$; $(a + x)(a^2 - ax + x^2)(a - x)$ or
$(a^3 + x^3)(a - x)$.

4. $\dfrac{1}{(2a^2-1)}$.   5. $a-x+1$.

6. (i) $x=\frac{1}{3}$. (ii) $x=1$. (iii) $x=4,\ y=5,\ z=6$.

7. Rs. 600.

Page 55. (XII—1876).

1. (i) 36. (ii) 0.

2. (i) 1. (ii) 1.   3   2.

4. (i) $(x+2y)(x-3y)$. (ii) $(x-y)(x-2y)(x+2y)$.

6. $6(x-2)(x+2)(x-1)(x+1)$.

7. $2x^2-3x^{-1}+4x^{-4}$; $2x^3-x^2-3$.   8. 1.

9. 2 min.   10. $1s.\ 4d.$

Page 57. (XIII –1877)

1. $-5x-3y$; $a-b-(-c+2d+1)$.   2. 1.

3. $x^2-3xy+2y^2$.

4. $3x-2$; $x(x^2-1)(x+3)(x-6)$.

5. (i) $\dfrac{2ab+ba^3-a^2}{b+ba^2}$. (ii) $\dfrac{47-4x}{12x-5}$.

6. (i) $x = \dfrac{a+b}{2}$. (ii) $x = -\dfrac{17}{2}$. (iii) $x = \dfrac{u}{7}$, $y=2\frac{1}{3}$.

7. Rs. 25.   8. 53 or 35

Page 59. (I—1873).

1. $a^2-2b^2+c^2$.   2. $(1+abc)$; rem. 2.

3. $a-b$.   4. 40.

Page 59. (II—1874).

1. (i) $\dfrac{x^2}{(x+a)(x+b)(x+c)}$.   (ii) a.

2. $c+2$.   3. 224 days nearly.

4. $x = \dfrac{16}{25}$.   5. 11.

Page 60. (III—1876).

1. (a) $(x+y)^3$.   (b) $2x^2-3c+\frac{1}{2}$.

2. (a) 0.   (b) x^2-y^2.

3. (a) $x=6$.   (b) $x = \dfrac{a(n-1)^2}{2n-1}$.   (c) $x = $ ▨.

    $y = $ ▨.

4. 800 men.

Page 61. (IV.—1878).

2. $x(5x^2-1)$.

3. (i) $\dfrac{x^{n-1}}{b(a+bx)}$.   (ii) $\dfrac{a+b+c}{a-(b+c)}$.

4. $a^3 + 2a^2 - a + 2$.

5. (1) $x = 40,\ y = 20$.

    (2) $x = \dfrac{a^3 + b^3 + b^2c + a^2c}{2bc - ac^2 - b_1{}^2 + a^2c}$.

    (3) $x = -5\ \dfrac{7}{8}$.

6. $11\frac{9}{12}$ miles.

Page 62. (I—1870-71 & 1871-72).

1. $a^7 - a^3 b^{\frac{1}{3}} - a^{\frac{1}{3}} b^2 + b^{\frac{7}{3}}$; $a^{\frac{5}{3}} + a^{\frac{5}{6}} b^{\frac{5}{4}} + b^{\frac{5}{2}}$.

2. $y - 1$.

3. (a) $\dfrac{x^2 - xy + y^2}{x^2 + xy + y^2}$. (b) $\dfrac{1}{(x+a)(x+b)(x+c)}$.

4. £24, £12.

Page 63. (II—1872-73).

2. $4 c^2 + 2x + 1$; $(x^6 + a^3)(x^4 + a^2 x^2 + a^4)$.

4. $\dfrac{4abc}{(a-b)(b-c)(c-a)}$.

5. $\sqrt{5x} - 2x^2 + \sqrt{3x} - 1$.

6. (a) $x = 0$. (b) $x = 5$, $y = 4$, $z = 3$.

Page 63. (III—1873-74).

1. $y - a$; $(x + y)(y + z)(z + x)$.

2. (a) $x = 10$. (b) $x = \frac{1}{2} \sqrt{\dfrac{d^2(d^2 - 4a)}{cd^2 - b^2}}$. (c) $x = 26 \dfrac{358}{529}$.

   (d) $x = 4$, $y = 1$.

3. 1; $\sqrt{2}$.

4. $\dfrac{1 + x}{x(2 + 3x)}$. 5. 100 miles.

Page 64. (IV—1875-76).

3. $x = \dfrac{\sqrt{3}}{2c}$. 5. $\dfrac{2abc}{ac + bc - ab}$

Page 65.   (V—1876-77).

$0; \dfrac{(v+y)(x^2+vy+y^2)}{y(x^2+y^2)}.$

(i) $x = \dfrac{ab^2+abc-b^2c+a^2c}{b(a+b)}.$ (ii) $x = \dfrac{nb-ma}{m-n}.$

(iii) $v=y = \dfrac{a}{6}.$ (iv) $x = \pm 5.$

12 gallons, 8 gallons.

Page 65.   (VII—1877-78).

3. $(r+qx)(s+tx).$

i) $x = \dfrac{2\sqrt{a+1}}{a}\cdots.$ (ii) $x = \dfrac{(ab+ac-bc)abc}{a^2b^2+a^2c^2-b^2c^2},$

$y = \dfrac{(ac-ab-bc)abc}{a^2b^2+a^2c^2-b^2c^2}.$

Page 66.   (VII—1879-80).

$\dfrac{(2ax-3y^2)\,x^{\frac{1}{3}}}{x^{\frac{1}{3}}+y^{\frac{1}{3}}};$ $\dfrac{ab^{\frac{1}{3}}}{b^{\frac{1}{4}}\pm c^{\frac{1}{4}}}.$

2. 4.

4. 27.

Page 67.   (I)

1) $3-x+2y.$ (2) $2\{a^2+(b-c)^2\}.$ (3) $x^2+9xy-y^2.$

$(a^2-b^2)^2;$ $x^4-y^4;$ $x-20;$ $\dfrac{x}{x-3}.$

(1) $x = -1\frac{5}{4}$ (2) $x = 12.$ (3) $x=5, y=6;$ $x=9.$

20 miles ; 5 hours after starting.

Page 68.   (II).

1. $\dfrac{3a}{2} - \dfrac{b}{15} - \dfrac{c}{12}$, $2x^2 - 19xy + y^2$; $10x^3 - x^4y - 34c^3y^2$
    $+ 40x^2y^3 - 18xy^4 + 3y^5$. $3x^2 - 5xy + 2y^2$;
    $-\dfrac{2x^3 - 3x^2 - x}{x^3 - 1}$.

2   (1) $x = 3$ (2) $x = 12$. (3) $x = 5$, $y = 2$. (4) $x = y = 5$.

Page 69.   (III).

1. $9a - 8b + 4c$; $4ab$; $x^5 - 9x^4 + 23x^3 - 32x^2 + 2cx - 9$; x^3
    $+ 3x^2y + 9xy^2 + 27y^3$.

2.   (1) $x = 5$.   (2) $x = 13$.   (3) $x = \frac{4}{3}$.   (1) $x = 10$, $y = 24$.

Page 69.   (IV).

1. $8c + 3y$; $21x^4 - 37x^3y + 18x^2y^2 - 26xy^3 - 24y^4$; $3a^2 + 4ab$
    $-b^2$; $\dfrac{4ab}{(a+b)^2}$.

2.   (i) $x = 12$.   (2) $x = 5$.   (3) $x = 7$, $y = 5$, (4) $x = 12$, $y = 15$
3. $\cdot 5$; $x : y :: 3 : 2$.

Page 70.   (V).

1. $a^2 - 8ab + 15b^2$.
2.   (i) $x^2 + x + 1$.   (ii) $4x^2 + 3x + 1$.
3. $-\dfrac{c^2}{2}$, $a^4 - 4a^3b + 6a^2b^2 - 4ab^3 + b^4$.
4.   (i) $\dfrac{x-3}{x(x+5)}$. (ii) $\dfrac{3}{(x+1)(x+4)}$.
5.   (i) $x^2(x+y)$,   (ii) b.
6.   (i) $x = 1$, (ii) $x = 2$, $y = 3$, (iii) $x = \dfrac{a-b+c}{2}$, $y = \dfrac{a+b-c}{2}$
    $z = \dfrac{b+c-a}{2}$.

8.   63.

Page 71. (VI).

1. $\dfrac{a+b+c}{2}$; $\dfrac{3x^2+5x+4}{x^2-1}$; $x^8-x^7y+x^6y^2-x^5y^3+x^4y^4$

   $-x^3y^5+x^2y^6-xy^7+y^8$.

2. a^4-b^4.

3. $x=2.$ $x=-3\frac{1}{5}.$ $x=\dfrac{a_1b-ab_1}{b-b_1}$,

   $y=\dfrac{ab_1-a_1b}{a-a_1}$.

4. $31\frac{9}{11}$ minutes past 4.

Page 72   (VII).

1. $2\frac{1}{6}$; 76. Yes.

2. (1) $5b^2+c^2$.   (2) $(a^2-x^2)(a+x)$.   (3) x^2-x-2.

   (4) $4x(1+x^2)$.

3. (i) $x=68$.   (ii) $x=14$.   (iii) $x=8,\ y=9$.

4. £1920.

5. $\cdot027$

Page 73. (VIII).

1. 1; (i) $2a+\dfrac{17}{3}b-\dfrac{3c}{4}$.   (ii) x^6-y^6.   (iii)$3x-5y$.

2. (i) $x=12$.   (ii) $x=20,\ y=17$.

3. Yes; $\dfrac{a^2+b^2}{2}$.

Page 73. (IX).

1. $\dfrac{5x^2}{2}$; 1; $(1-x)(1-3x)$; $4\frac{3}{8}$.

2   (1) $x = 6.$ (ii) $x = 7,$ $y = 3.$

3   2 01; $x^2 + 2x - 1$, $-\dfrac{c^2 - b^2}{2(a-c)}$ ∞

4   $x = 2$

5.   **36 men**

Page 74. (X).

1   $9a + 9b + 9c$; $9(a^2 + 2ab + b^2 + 2ac + 2bc)$;

$\dfrac{3x^2}{(1+x)(1+x+x^2)}$; $(x^2 + ax + a^2)(x^2 - ax + a^2).$

2   (i) $x = 110.$ (ii) $x = a + c.$ (iii) $x = \dfrac{2ab}{b-a},$ $y = \dfrac{2ab}{a+b}$

Page 75. (XI).

1. $\dfrac{1}{x-1}$; $\dfrac{x-1}{x-2}$

2   $x = 2.$ 4 $x^2 - x + 1$, $\sqrt{x} + \dfrac{1}{\sqrt{x}}$

Page 76. (XII).

1. 0 ; 0; (i) $2(4b - a).$ (ii) $-4x^2 z^2.$ (iii) $\dfrac{(x^2 - 2)^2}{2(x^2 - 2x + 2)}$;

$x^5 - 5x^4 a + 10x^3 a^2 - 10a^2 x^3 + 5xa^4 - a^5.$

2   (i) $x = 4.$ (ii) $x = \frac{1}{2}.$ $y = \frac{1}{3}.$

3. $-\dfrac{(a^2 - b^2)(a-b)}{a^2 + b^2}$.   4.   Yes.

Page 76. (XIII).

1   $2(x + 2y - z)$; $2(x^2 - 2xy - 4y^2 - 2xz - 2yz + z^2)$;

$-\dfrac{8(y+2)}{8y-1}$; $\dfrac{1-8x}{(x-1)(x-2)(x-3)}$.

2. (i) $x = 12$. (ii) $x = 5$, $y = 11$.

Page 78. (I).

1. $4\frac{1}{5}$.   2. $60x^3(x-1)^2(x+1)^3$.

3. (i) $\dfrac{(3x^2+1)(x-2)}{(x-6)(x+1)(x-1)}$.   (ii) $\dfrac{15}{2}(x+1)$.

4. (i) $x = 3b - 2a$. (ii) $x = 144$. (iii) $x = 5$, $y = 1$.

5. £52; £2. 12s.

Page 78. (II).

1. $x^{\frac{2}{3}} - x^{\frac{1}{3}}y^{\frac{1}{3}} + y^{\frac{2}{3}} - x^{\frac{1}{3}}z^{\frac{1}{3}} - y^{\frac{1}{3}}z^{\frac{1}{3}} + z^{\frac{2}{3}}$.

2. $x^2 + 2x + 3$; $90a^2b^2(a^3 - b^3)$.

3. (i) -1. (ii) 1. (iii) abc.

4. (i) $x^2 - 3ax + 2a^2$. (ii) $\dfrac{x}{2a} + 1 - \dfrac{2a}{x}$.

5. (i) $x = 3$. (ii) $x = -1$, $y = 1$, $z = 0$.

Page 79. (III).

1. $2a^2b^2 + 2a^2c^2 + 2b^2c^2 - a^4 - b^4 - c^4$; $a^2 - b^2 + c^2 - 2ac$;

     $x^{\frac{1}{3}} + y^{\frac{1}{3}} - z^{\frac{1}{3}} - 2x^{\frac{1}{3}}y^{\frac{1}{3}}$.

2. $x^2 + x + 1$; $60(x-1)(x-2)(x+1)$.

3. (i) $\dfrac{4abc}{(b+c-a)(c+a-b)(a+b-c)}$. (ii) 1. (iii) abc.

4. (i) $2x^2 + 3ax - 2a^2$. (ii) $\dfrac{3x}{a} - 1 + \dfrac{a}{3x}$.

5. (i) $x = a$. (ii) $x = -3$, $y = -\frac{1}{3}$, $z = 1$.

Page 81.   (IV).

1. $27x^3 + 8y^3 + z^3 + 12x^2y + 6x^2z - 18xyz.$

2. $3(x-2)(x+1).$ 3. $2\dfrac{x}{y} - 2\dfrac{y}{x}.$

4.   (i) $\dfrac{10(x^2+1)}{(x+1)^2(x-1)^2}.$ (ii) $a.$

5.   (i) $x = 7.$ (ii) $x = y = 6.$ 6.   9, 7, 5.

Page 81.   (V).

1. 9.   2. $x-1$; $ax(x^3-a^3)(x^3+a^3) = ax(x^6-a^6)$

3. (i) $\dfrac{1}{(x+1)^2}$—.   (ii) $\left(a^{-1}-x^{-1}\right)(x-a)x = a^{-1}x^2 - 2x + a.$

4. $a^3 - 3a^2x + 3ax^2 - x^3.$ 5.   (i) $x = 7.$ (ii) $x = \tfrac{1}{2}, y = 1\tfrac{1}{2}.$

Page 82.   (VI).

1   $a^3 + b^3 + c^3 - 3abc - 3abd - 3acd - 3bcd = a^3 + b^3 + c^3$
    $- 3ab(c+d) - 3cd(a+b).$

2   $x^2 + 1 + \dfrac{1}{x^2}$—.   3. $\dfrac{x^2(a^2+x^2)}{a(a^3+2x^2)}.$

1   $(a^2-x^2)(a^2-4x^2)$; $x+3.$ 5.   (i) $x = 0.$ (ii) $c = 4, y = 6.$

6   $10\tfrac{10}{11}.$

Page 83.   (VII).

2. (i) 0.   (ii) 1.   (3) $x-1$; $x^6-1.$

4. $x + a + a^2x^{-y}.$

5. (i) $x = \dfrac{b-a}{3}$. (ii) $x = a - b$. (iii) $x = q + c, y = b + c,$
   $z = a + b$.

Page 84. (VIII).

1. 22.   2. $a^5 - 4a^3 + 5a + \dfrac{1}{a^3} - \dfrac{3}{a^5}$. $v^3 + y^3$.

3. $(v^3 - 1)(v - 2)(x - 3)$; $x^2 + 1$.   4. 3

5. $\dfrac{2c^2}{3} - 6c + 1$.

6. (i) $x = 15$. (ii) $x = 2$.   7. 20. 16

Page 85. (I).

1. $x^6 - a^6$; $(x^3 + 1)(x^2 + x + 1)$.   2. $a - 3b$, 1.

5. (a) $x = 5$. (b) $x = 2, y = 1$.

Page 86. (II).

1. $x^4 - x^3(a - b + c - d) - x^2(ab - ac + bc + ad - bd + cd)$
   $+ x(abc - abd - bcd + acd) - abcd$; $(c^3 - 1)(v^2 - x + 1)$

2. $2a - 10x + 15y$; $\dfrac{8}{15}$.

5. $x = -79$; $x = 1, y = \frac{1}{2}$.

Page 86 (III).

1. $9x^3 + 6x^4 + 31x^5 + 10x^6 + 25x^7$; $x^2 - 7x + 7$.

2. (i) $3a - 5b$. (ii) $3a - 5b$.

3. $x = 15$, $y = 2$. $x = 6$. $x = 30$.

    (a) $x = 2$, $y = 3$. (b) $x = 7$. (c) $x = 30$.

Page 87   (IV).

1. $8a^2 + 6ab - 4b^2$.   2. 35.

3. $a^4 - 2a^2b^2 + b^4 - c^4 + 4abc^2 = (a^2 - b^2)^2 - c^2(c^2 - 4ab)$

4. $a^4 + 2a^3b - 3a^2b^2 + b^4$.

6. (i) $x = 1\frac{1}{2}$. (ii) $x = -59$. (iii) $x = -3$, $y = -1$.

7. £200.   8. A's age 56 years, B's 16

9. 4 days.

Page 89.   (I).

1. $a^8 - x^8$.   2. $1 - x + x^2$, $1 + x +$.

3. 3000 men.   6. 4 and 6 hours.

7. $2c^2$.   8. £60. or 40

Page 90.   (II).

1. $-2a^3xc^3 - 2abxc^2 + 4(a^2x^3 + 8ax - 2abx)c$.

2. $1 - 6ax + x^2(9a^2 + \frac{2}{3}) - 2ax^3 + \frac{1}{9}x^4$; $16a^4 + 8a^3b + a^2b^2 - 4b^4$
      $(x^6 + y^6)(x^3 - y^3)$.

3. $x + 4$; $(x^2 + 7x + 12)(x + 4)$.

4. $a + b + c$; $\dfrac{\sqrt{5}}{2} - 1$.   5. $\dfrac{a^2 + 3ab + b^2}{(6a + \frac{1}{3}b)(a + 2b)}$.

6. (a) $a \dfrac{\frac{pq}{n}}{\frac{pq}{b\;m}}$. (b) $4\sqrt[3]{2}$. (c) $\dfrac{16\sqrt{2}+3\sqrt{3}-16\sqrt{6}-64}{5}$

   (d) $\sqrt{x^2-1} + \sqrt{x^2+1}$

7. (a) $x=6$. (b) $x=\dfrac{m^2-n^2}{ma-nb}$, $y=\dfrac{n^2-m^2}{na-mb}$ (c) $c=a$.

   (d) $x=\pm a,\ y=\pm b$. 8 $A:B::1:7$.

9. $4\frac{1}{5}$ hours.

Page 91. (III).

1. $b-d$; x^8+x^4+1. 2. $x-y$; x^4-16a^4

3. $5x^2-3ax+4a^2$. 4. (a) $x=2\frac{1}{5}a$. (b) $x=2.\ y=6$.

5. (a) £540. (b) 17.

Page 92. (IV)

1. $-\frac{1}{12}$; $a^2+b^2+c^2$.

2. (i) $\frac{1}{3}x^3+\frac{1}{6}x^2-\frac{7}{9}x+\frac{4}{3}$. (ii) $x^2-4y+9z^{\frac{2}{3}}+6xz^{\frac{1}{3}}$.

   (iii) $a^{3m}b^{2p-1}c^2$.

3. (i) $m+n+p+q$. (ii) $1+5x+15x^2+45x^3$.

   (iii) $a^{\frac{3}{4}}+a^{\frac{1}{2}}b^{\frac{1}{4}}+a^{\frac{1}{4}}b^{\frac{1}{2}}+b^{\frac{3}{4}}$.

4. (i) $2x^3-4x^2+x-1$. (ii) $16x^4-1$.

5. (i) $2\frac{5}{8}$. (ii) c.

6. (i) $x=4$. (ii) $x=\dfrac{2ab-b^2}{2(a-b)}$. (iii) $x=5,\ y=9$.

   (iv) $x=\dfrac{m^2-n^2}{ma-nb}$, $y=\dfrac{n^2-m^2}{na-mb}$.

7. (i) $\dfrac{28}{\sqrt{15}}$. (ii) $4+\sqrt{2}$. (iii) $\sqrt{1-x}$.

8. $\dfrac{4}{15}$.

9. 20.

Page 94. (V).

1. 0 ; $y^2(4y-9x)$.

2. $a^4-4a^3b+20a^2b^2-32ab^3+64b^4$
$x^2-4xy+4y^2$.

3. $x+3$; $24a^2b^2(a^2-b^2)$.

4. $-\dfrac{c^2-11c+28}{x^2}$.

5. (i) $-\dfrac{\frac{7}{5}-\frac{3}{4}c}{\frac{1}{10}b+\frac{1}{10}z}$. (ii) a.

6. $3\sqrt{5}$, $36\sqrt{3}$, $18\sqrt[3]{2}$, $6\sqrt{\frac{1}{24}}$

7. $4\sqrt{2}-3$; $1+\sqrt{2}$.

8 (i) $x=\dfrac{25a-18b}{13}$. (ii) $x=4$, $y=2$.

9. 22 miles.

Page 95. (VI).

1. $10a^3+12b^2+22c-5d-4ad$, $(a+b)^4-(a+b)^3c+(a+b)^2c^2$
$-(a+b)c^3+c^4$.

2. $a^6+2a^3b^3+b^6$; $x^2-4y+9z^{\frac{2}{3}}+6xz^{\frac{1}{3}}$.

3. $a(a+x)(a+b^2)$; $a^2(3a+2b)(a-4b)$.

4. $(x-1)(x+3)$; $72a^3b^2xy(a^2-b^3)$.

5. (a) 0. (b) 27

6. (a) $x=6$ or 2. (b) $x=3$. (c) $x=\dfrac{a^2}{m^2(b+b)^2}$, $y=\dfrac{1}{m(a+b)}$.

7. 50 yards.

8. $a^6-3a^5b+6a^4b^2-7a^3b^3+6a^2b^4-$
$3ab^5+b^6$; $1-x+x^2$.

9. A could do the work in 10 days, B in $3\frac{1}{5}$ days.

Page 96. (VII).

1. $1 + abc$.

2. $\dfrac{4}{3(x+1)}$.

3. $3 + \sqrt{7}$.

4. $x = 2$.

5. 40 men.

Page 97. (VIII).

1. $b + c$; 5.

2. $3x^3 + 2c^2 - 4x - 10$.

3. (i) $-\dfrac{a+b}{ab(a-b)}$. (2) $\dfrac{x^3 + 3y^3}{x(x^2 - y^2)}$. (3) $a^{\frac{1}{3}} c^2$.

4. $2x - 3y + 3$.

5. $2c - 1$; $(x^3 - 1)(c - 3)$.

6. (8) $x = 8$. (2) $x = 7$, $y = 8$. 7. 150.

Page 98. (IX).

1. $a + b - c$.

2. $a^6 - a^5b - 2a^4b^2 + 3a^3b^2 - 2a^3b^4 - ab^5 + b^6$; $2x^2 - xy - 2y^2$.

3. $3a^2 - 7ab - b^2$.

4. $5x - y$.

5. (1) 1. (2) $\dfrac{a(a+b)}{b}$.

6. (1) $x = 7$. (2) $x = 18$, $y = -8$.

7. A's £18, B's £6.

Page 99. (X)

1. $4x^4 - 2x^3y + x^2y^2 - xy^3 + \frac{1}{2}y^4$; $25x^{\frac{7}{2}} - 15x^{\frac{3}{2}}y + 16cy^2$

2. $3x + 7$; $(x^3 - 8)(x^2 - x - 6)$. $+15x^3y - 9y^4$.

3. (1) $\dfrac{a^3(a^2 + b^2)}{a^6 - b^6}$. (2) $-\dfrac{1}{x}$. (3) $\dfrac{a^3}{a^2b + a - b}$.

4    $2a^2 - 3x + 5$; $7 - \sqrt{6}$.   5. (1) $x = 5$. (2) $x = 3, y = -3$.

6.   100 bushels.

Page 100.   (XI).

1.   (a) $(a + b)(a^5 - a^4 b + a^3 b^2 - a^2 b^3 + ab^4 - b^5)$.

2. $(a + b + c)(a + b - c)(b - a + c)(a - b + c)$.

3. $(x + \dfrac{1}{x} - 3) \left(x^2 + \dfrac{1}{x^2} + 9 - 1 + 3x + \dfrac{3}{x} \right)$.

4. $x^3 - x^2(a + b + c) + x(ab + ac + bc) - abc$.

$$\left(x - \frac{a}{b} \right)\left(x - \frac{b}{c} \right)\left(x - \frac{c}{a} \right).$$

6.   (b)   0.   9.   (b) $\dfrac{1}{(a + b)(b + c)(c + a)}$.

10.   (i) $x = -5$,   (ii) $x = 3$, $y = 2$.

11.   Length $= 180$ yards, breadth 90 yards.

Page 102.   (I).

1. $2(a + b + c)$; 1.   2.   21.

3. $2a^2 - 3ab + 4b^2$.   4. $12abc$; $(a^{\frac{1}{2}} + b^{\frac{1}{2}})(a^{\frac{1}{4}} + b^{\frac{1}{4}})$.

6. $8x^2 + 14x - 15$; $10a^5 b^5$.   7. $x^2 - x + 1$.

9. $2bd - b^2 - d^2$.

10. (1) $2(a + b + c + d)(a - d)$.   (2) $(x + y - z)(x - y + z + 1)$.

    (3) $(a + b - c - d)(a - b + c - d)$.

    (4) $(x + y - 1)(x^2 + y^2 - xy + x + y + 1)$.   11. $x + 1$.

12.   (i) $\dfrac{3x - 5}{x^2 - 3x + 1}$.   (ii) $\dfrac{x - b}{x + b}$.   (iii) $\dfrac{(e^x - 1)(x^2 - x + 1)}{(e^x + 1)(x - 1)}$.

                    (iv) $\dfrac{2x^2 - 3ax + 7a^2}{x_2 - 6ax + 2a^2}$.

13 3.   14. 1.

15. $a^{\frac{2}{5}} - a^{\frac{1}{5}}b^{\frac{1}{3}} + b^{-\frac{1}{3}}$.   16. $4x^2y^2$.

17. $x^8 - 2a^4x^4 + a^8$.

18. $a^4 + 4a^3b + 6a^2b^2 + 4ax^3 + x^4$; $1 + 10x + 40x^2 + 80x^5 + 80\,c^4$
       $+ 32x^5$,

20. (1) $x = 2$. (2) $a = 8$. (3) $x = 7$, $y = 2$, (4) $x = 4$, $y = 0$, $z = 5$.

21. 44 days nearly.

22. Price of a horse = Rs. 24; Price of a cow = Rs. 12.

Page 105. (II)

1. $9a^2 - 6ab + 4b^2$.

2. $x - 3y$.
                                    3. $\dfrac{x}{y} - \dfrac{1}{2} + \dfrac{v}{x}$.

5   $x - \dfrac{\sqrt{x+1}}{2}$.   6. (a) $\dfrac{13 - 9x}{12 - 8x}$. (b) $a^{\frac{2}{5}}b^{\frac{2}{3}}c^{\frac{2}{4}}$.

9   3.

10. (i) $x = \dfrac{17}{20}$. (ii) $\dfrac{a}{2}$, $y = \dfrac{b}{2}$. (iii) $x = 1$, $y = 2$, $z = 4$.

11. A $5\frac{1}{3}$ days; B in 16 days.   13. 1.   15. 0.

19. 1650 miles.

20. $x = \dfrac{(d_1b_3 - d_3b_1)(c_1b_3 - c_3b_1) - (d_1b_3 - d_3b_1)(c_1b_2 - c_2b_1)}{(a_1b_2 - a_2b_1)(c_1b_3 - c_3b_1) - (a_1b_3 - a_3b_1)(c_1b_2 - c_2b_1}$

21. 631.

Page 108. (III)

1. $x^3 + ax^2 + bx^2 + cx^2 + abx + acx + bcx + abc$; $x^3 + 3x^2a +$
       $3a^2x + a^3$.

2. $x + \sqrt{3xy} + y$.   3. $(a - b + c - d)(a + b - c - d)$;
                                         $y(a + b) + x(a - b)$.

4. $2a$.   **5.** G. C. M. $= x+1$. L. C. M. $= (x-1)(x-2)$
$(x-3)(x-4)$.

6. $9a^{-9}b - 4a^{-7}b^{-1}$.   **7.** $2x^2 - 3xy + 0y^2$.

8. $x^2 - \dfrac{x}{2} + \dfrac{2}{x}$.

10. $y^4 + 11y^3 + 47y^2 + 93y + 69$ **11.** $2a - x$.

12. (a) $x = 8\frac{2}{3}$. (b) $x = 0$. (c) $x = 0,\ y = a$.

13. $4\frac{1}{11}$ min. or $6\frac{9}{11}$ min. after 1 o'clock (d) $x = -2$ $y = 2,\ z = 2$.

14. $x = \frac{7}{8},\ y = -\frac{5}{2},\ z = \frac{11}{10}$.

16. A performed the journey in 40 hours, B in 60 hours.

17. $4 + 2x^{\frac{1}{2}} - 3x$.

18. $\dfrac{(a+1)(b+1)}{(a-1)(b-1)}$,

20. $\dfrac{2xy}{ab} + \dfrac{2ab}{xy}$; $\dfrac{2ay}{bx} + \dfrac{2bx}{ay}$.

22. (i) $x = 6$. (ii) $x = 17, y = 2$.   **23.** 800 men.

24. £5   **25.** £1380.

26. Rs 355.   **27.** 5 yards and 8 yards.

The

INDIAN STUDENT'S COMPANION

To

ARITHMETIC.

BEING A COLLECTION OF NEARLY ALL THE EXAMINATION
PAPERS IN ARITHMETIC OF THE INDIAN UNIVERSITIES,
AS WELL AS THOSE OF THE UNIVERSITIES OF LONDON,
OXFORD AND CAMBRIDGE.

WITH ANSWERS

BY

ABHAY CHARAN PAUL, B. A, B. L.

CALCUTTA UNIVERSITY
ENTRANCE EXAMINATION PAPERS.

ARITHMETIC.

I.—(1858).

1. Multiply Rs. 18,957-13 by Rs. 568-11¾; and divide the same sum by the same sum, shew that the one of these operations is absurd and impossible, and perform the other.

2. Find the value of the decimal ·16854, and deduce the rule arithmetically or algebraically.

3. Extract the square roots of 3 and of ·3 to 7 decimal places, and explain the rule that in integers the pointing off of the periods begins from the right hand, and in decimals from the left.

4. A plate of metal is beaten to the thickness of ¼ of an inch, and the weight of a circular medal cut from it, whose diameter is 1¼ inches, is 1¼ oz. Troy. If the same plate be beaten to the thickness of ⅓ of an inch, what will be the weight of a medal cut out of it of the diameter of 1½ inches, (the areas of circles being proportional to the squares of their diameters)?

II.—(1859)

1. A man can count at the rate of 100 a minute—how long will it take him to count five hundred lacs?

2. A shopkeeper purchased 250¾ yds. of cloth for Rs. 900, and paid expenses amounting to Rs. 103. What must he charge per yard, in order to make a profit of 50 per cent.?

3. Reduce ·005 of a pound to the fraction of a penny, and extract the square root of ·00006241.

4. Add together

$$\frac{2\frac{1}{2}}{3\frac{1}{3}}, \qquad \frac{1\frac{1}{4}}{3}, \qquad 9 \text{ and } \frac{3}{4} \text{ of } \frac{3}{5} \text{ of } \frac{5\frac{2}{3}}{7}.$$

5. State the rules for pointing in the multiplication and division of decimals; and multiply ·256 by ·0025 and divide ·0036 by ·4 and 4 by ·00001.

III.—(1860).

1. What do you mean by *a prime number, a factor, a ratio* ? Resolve 30 and 120 into their prime factors, and find their ratio in its simplest terms.

2. How much muslin at 1 rupee, 5 as. 8 pie per yard is equal in value to 143 yards of cambric, at 3 rupees, 13 as. 8 pie per yard ?

3. Whether is the product of $2\frac{1}{4}$ and $3\frac{1}{3}$, or the product of $2\frac{1}{2}$ and $3\frac{1}{4}$ the greater? Extract the square root of the difference.

4. If a person get a bequest of $\frac{5}{9}$ of an estate of 2,000 acres, and sell $\frac{3}{5}$ of his share, how many acres does he retain ?

Simplify the expression $\dfrac{1}{10 + \dfrac{1}{2 + \frac{1}{50}}}$.

5. Find by practice the rent of 586 acres, 1 rood, 31 poles at £4. 1s. 10½d. per acre.

6. A piece of land is 11·916 poles broad, how long must it be to contain an acre ? Divide accurately 0·063 by 0·036

7. How much must be paid for £1,250 stock when it sells at 108 per cent. ?

IV.—(1861).

1. If the price of bricks depends upon their magnitude, and if ·100 bricks, of which length, breadth, and thickness are 16, 8 and 10 inches respectively, cost Rs. 2, 9 as., what will be the price of 9,21,600 bricks, which are one-fourth less in every dimension ?

2. Explain the method of pointing in extracting the square roots of whole numbers and decimals. Find the square root of 57214096, and also the square root of ·5 to four places of decimals.

3. Simplify $(1 + \frac{5}{8} + \frac{7}{8} + \frac{11}{12}) \div (\frac{3}{4} - \frac{4}{5})$;

and $\dfrac{7\frac{1}{2}}{6\frac{1}{4}} + \dfrac{11\frac{1}{4} - 2\frac{2}{3}}{11\frac{1}{4} + 2\frac{2}{3}} \times 10\frac{9}{13} - 6\frac{44}{173}$.

4. A tea dealer buys a chest of tea containing 2 maunds and 24 seers at 4 Rs. 2 as. per seer, and two chests more each containing 3 maunds and 2½ seers at 4 Rs. 10 as. per seer, at what rate per seer must he sell the whole in order to gain 576 Rupees ?

V.—(1862).

1 What is the difference between $\dfrac{4\frac{3}{4}}{5\frac{1}{6}} - \dfrac{99}{310}$ and ·06 ?

2. Reduce ·14 of a pie to the fraction of a Rupee, and find the value of ·0875 of a pound sterling.

3. If the wages of 18 coolies for a month amount to 85 Rs. when rice is 24 seers per Rupee—what ought the daily pay of a coolie to be in proportion when the price of rice is Rupees 2-10-8 per maund ?

4. A and B run a race. A has a start of 40 yards and sets off 5 minutes before B, at the rate of 10 miles an hour. How soon will B overtake him if his rate of running is 12 miles per hour ?

VI.—(1863).

1. Find the value in vulgar and decimal fractions of .—

$$\frac{15\frac{3}{4} + 7 - \frac{3}{4}}{7\frac{4}{9} \times \frac{5}{12}}.$$

2. Find the fractional value of :—

$$(2\cdot37979 + 4\cdot22) \div (3\cdot041 - \cdot937).$$

3. The weight of five casks of coffee being 31 cwt. 3 qrs. 13 lbs., calculate the price at 90 shillings per cwt.

4. If a man can perform a journey of 170 miles in 4½ days of 11 hours each, in how many days of 8¾ hours will he perform a journey of 470 miles ?

5. Extract the square root of :—

964·226704.

6. What sum of money will produce £43 interest in 3¼ years, at 2½ per cent. simple interest ?

VII.—(1864).

1. How many paving stones, eac hmeasuring 14 in. by 12 in., are required to pave a verandah 70 ft. long and 9 ft. broad ?

2. Add together $\frac{1}{3}$, $\frac{1}{7}$, $\frac{1}{11}$, $\frac{13}{33}$, and $\frac{3}{77}$. And simplify
$$\frac{2\frac{1}{4}}{2\frac{2}{3}} + \frac{2\frac{1}{3} + 5\frac{1}{2}}{3\frac{1}{4} + 9\frac{1}{2}} \text{ or } \frac{1}{2} + \frac{3}{4} \text{ of } \frac{3}{10}.$$

3. Find the value of 17 cwt. 3 qrs. 22 lbs. at £4. 6s. 7½ d. per cwt.

4. Add together ·0125 of a pound, ·0625 of a shilling, and ·5 of a penny; and reduce 11s. 9½d. to the decimal of a pound.

5. Extract the square root of ·000196, and divide the result by 140.

6. A company guarantees to pay 5 per cent. on shares of 1,000 rupees each; another guarantees to pay 4⅝ per cent. on shares of 75 rupees each: the price of the former is 1,245 rupees, and of the latter 85 rupees. Compare the rates of interest which the shares return to purchasers.

VIII.—(1865).

1. Find the value of $11\frac{3}{4} + 14\frac{5}{8} + 21\frac{7}{40} + 32\frac{3}{6\frac{1}{2}5}$, both by vulgar fractions and decimals, showing that the two results coincide; and reduce 25° 36′ 45″ to the decimal of 75°.

2. Find the product of the sum and difference of ·0421 and ·0029, and divide one-tenth the square root of the product by ten times the continued product of ·02, ·03, and ·07.

3. How many yards of matting 3·5 feet wide will cover the floor of a room 85·3 feet long, and 40·5 feet broad; and how much will it cost at 2 Rs. 10 as. 8 pie per square yard?

4. If the wages of 25 men amount to 766 R. 10 A. 8 P. in 16 days, how many men must work 24 days to receive 1,035 R. the daily wages of the latter being one-half those of the former?

5. What principal in 3 years, 73 days will amount to 100 R. 15 A. at 6¼ per cent simple interest? A bill for 5,035 R. 4 A. drawn on September 12th at 5 months was discounted on January 16th at 4 per cent.; what was the discount charged?

IX.—(1866).

1. Reduce 3° 45′36″·25 to the decimal of 36°.

Simplify $\left(\frac{1}{3} + \frac{\frac{2}{3}}{1\frac{2}{3}} + 1\frac{1}{4} + \frac{3}{5} - 1 \right) \div \frac{3}{5}$ of $\frac{5}{8}$ of $2\frac{1}{4}$.

2. Find the value of 6 cwt. 2 qrs. 7 lbs. at £3. 4s 6½d. per cwt.

3. Find the square of 0·0204 and the square root of 81·757764; and divide one-tenth of the latter result by one hundred times the former.

4. Divide 0·10001 by 0·000390625 ; and 10·01 by 390·625.

5. What is the expense of paving a rectangular verandah whose length is 42 feet and breadth 15 feet, with Burdwan paving stones, 18 inches square, and which cost Rs. 15 per score ?

6. The 3 per cents. are at 85½ ; what price should the 3½ per cents. bear that an investment may be made with equal advantage in either stock? and what interest would be derived by so investing £5000?

X.—(1867).

1. The driving wheel of a locomotive is 226 inches in circumference, and makes 91 revolutions per minute, at what rate per hour is the engine travelling ?

2. Divide the least common multiple of 156, 260, 720, and 429 by their greatest common measure, and find the square root of the quotient.

3. If a butcher buy 10 cwt of beef at 44s 4d per cwt. and sell it at the rate of 4½d per lb, how much does he lose or gain ?

4. Find the value of the following expressions —

$$\frac{5\frac{1}{2} \times \frac{3}{4}\frac{1}{4} \times 9\frac{1}{2} \times 3\frac{9}{10}}{1\frac{1}{2} \times 67} \quad \text{and}$$

$$\frac{0·625 \text{ of } £143. \ 12s. \ 0d. + 0·625 \text{ of } £71. \ 16s. \ 0d.}{\frac{1}{2} \text{ of } 5175}.$$

5. Reduce £1. 5s. 6d. to the fraction of £2,000 and 5s. 1¾d to the fraction of £150. 10s. and express the results both as vulgar and decimal fractions.

6. If £450 amount to £523.10s. in 1 year 8 months, calculate the rate per cent.

XI.—(1868).

1. Find the difference between 1·6 of 3·4 of £1·125 and ⅓ of 3·6 of £2·125, and find the value of—

$$\frac{6·27 \times 0·5}{(\frac{1}{2} \text{ of } \frac{1}{2}) \times 3·36} \quad - \quad \frac{6\frac{1}{4} \text{ of } \frac{1}{10}) \times (\frac{1}{2} \text{ of } 21\frac{1}{2})}{(\frac{1}{2} \text{ of } \frac{6}{7}) + 1·4}$$

2. Extract the square root of 153·140625, and of 3·2, each to three places of decimals

3 If one man walks 165 miles in 6 days, how far will another man walk in 15 days if he walks 3¼ miles in the same time that the other man walks 4 miles?

4. Three equal glasses are filled with a mixture of spirits and water : the proportion of spirits to water in each glass is as follows:—in the first glass as 2 : 3, in the second as 3 . 4, and in the third as 4 : 5. The contents of the three glasses are poured into a single vessel : what is the proportion of spirits to water in it?

5 Find the interest on £2350 from 3rd March to 28th December. at 4½ per cent per annun.

6. How many yards of carpet, 25 inches wide, will be required for a room, 19 feet 7 inches long, and 18 feet 9 inches wide?

XII.—(1869).

1. Simplify $\dfrac{1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} - \frac{1}{12}}{\frac{1}{3} + \frac{1}{3}} - \dfrac{\frac{1}{2} + \frac{1}{4}}{1 - \frac{1}{3} \times \frac{1}{3}};$

and reduce 4hrs. 1min. 10¼ sec. to the decimal of a week

2. Add together ·062435 of 100l. + 7·4375 of 10s. + 1·356 of 7s. 6d. + 2·784 of 2½d., and reduce the result to the fraction of 29l. 10s. 7¾d.

3. Divide ·0007 by ·035 and by 3500, and extract the square root of each quotient to 4 decimal places.

4. A room is 37 ft. 2 in. long, 25 ft. 8 in. broad, and 22 ft. 6 in. high : find the cost of covering its four walls with paper 1¼ yds. wide at 1s 1¾d. a yard.

5. In what time will 563l. 13s. 4½d. amount to 901l 17s. 4⅜d., at 3¾ per cent?

XIII.—(1870).

1. Find the cost of matting a room whose floor is 8 yards long by 7¼ yards wide, with mats 2 feet wide and 9¼ feet long, at the rate of 9 annas 2 pies per mat.

   If the same room be 15½ feet high, find how many cubic feet it will contain.

2. Distinguish between a vulgar fraction and a decimal fraction. Multiply 999 $\frac{19}{24}\frac{23}{26}$ by 999.

State the rule for the multiplication of decimals, and apply it to point the products in (1) $1.23 \times .0011$ and (2) $29000 \times .01$.

Divide $3\dot{7}$ by $.14\dot{8}$, and show that $\dfrac{.\dot{1}2\dot{3}}{.\dot{4}\dot{1}} = \dfrac{123123}{414141}$.

3. Find the square root of $19740\frac{1}{4}$ and of $4\frac{1}{13}$, the latter to four places of decimals.

4. Two gangs of six men and nine men are set to reap two fields of 35 and 45 acres respectively. The first gang complete their work in 12 days, in how many days will the second gang complete theirs?

5. Find which is the better investment, $3\frac{1}{2}$ per cent. stock at $98\frac{1}{4}$ or $3\frac{1}{4}$ per cents. at 105.

6. Find how many rupees are equivalent to $200l$. at the rate of $1s. 11\frac{1}{16}d.$ per rupee.

XIV.—(1871).

1. 6625 railway tickets were sold at a station. $\frac{3}{8}$ths of which were .9 annas each and the rest 5 annas each. What was the amount received for the tickets?

2. Find the greatest and least of the fractions $\frac{1}{2}$, $\frac{5}{8}$, $\frac{7}{9}$, $\frac{23}{100}$. Add together $2\frac{2}{3}$ of £2. 13s. $6\frac{1}{4}d.$ and £3. 15s. $9\frac{1}{2}d. \div 6\frac{3}{4}$; and simplify :—

$$\frac{2\frac{1}{2} - 1\frac{3}{4}}{4 \text{ of } 1\frac{1}{3} + 6 \times \frac{1}{3}} \times \frac{5 - \frac{5}{8}}{\frac{1}{3} + \frac{2}{3}} + \frac{5}{9}.$$

3. Divide $.027$ by 14.4 and 1208.04 by $.017$. Find the value of 11.1375 of Rs. 6, 8 annas—$.56$ of Rs. 7, 8 as. and reduce 8 as. 6 pie to the decimal of Rs. 3. 7 as.

4. If the carriage of $9\frac{3}{4}$ maunds for a distance of 80 miles be Rs. 3, how many miles should 130 maunds be carried for Rs. 27, 8 as.?

5. What sum of money will amount to Rs. 3761, 14 annas in $3\frac{1}{2}$ years at $4\frac{1}{2}$ per cent. per annum, simply interest?

XV.—(1872).

1. A merchant bought goods which cost him Rs. 9,810. In the first day he sold to the amount of Rs. 992, 8 as. 6 pie; in the second to that of Rs. 1,992, 8 as. 3 pie; and in the next three days to an amount equal to twice the two former. Finding that he had one-fourth of the goods left, he calculated his profits in the five days. How much were they?

2. What fraction of Rs. 10 is Rs. 6, 10 annas 8 pie?

   Find the value of—

   $\frac{3}{4}$ of Rs. 2, 8 as. $+ \frac{2}{3}$ of Rs. 4, 11 as. $+ 2\cdot05$ of Rs. 5.

   Simplify $4\frac{1}{3}$ of $\frac{3}{35}$ $- \frac{\frac{3}{7}}{2\frac{1}{3}} + \frac{5\frac{1}{2} - 4 \text{ of } \frac{3}{4}}{3\frac{1}{4} - 2\frac{1}{4}}$.

3. Divide 274·72 by ·0544: find the value (correct to six places of decimals) of (i) $\frac{\cdot003 \times \cdot05}{\cdot0022}$, (ii) $6\cdot045 - 5\cdot3678$; and extract the square root of 951·1056.

4. Find by practice the cost of 15 mds. 25 srs. 11 chs. of oil at Rs. 12, 10 as. 3 pie per maund.

5. If the interest of Rs. 1,000 in 5 years be Rs. 250, what will be the interest of Rs. 3,500 for 1 year and 6 months?

XVI.—(1873).

1. Find the value of (i) $\dfrac{1 + 2\frac{1}{2} + 3\frac{1}{2}}{\dfrac{1}{1\frac{1}{2}} + \dfrac{2}{2\frac{1}{4}} + \dfrac{3}{3\frac{1}{4}}} \times \dfrac{55\frac{2}{3} \div 11}{1\frac{2}{11} \text{ of } 13\frac{1}{4}}$.

   (ii) $2\frac{4}{5}$ of Rs. 103, 7 as. 6 pie.

   If $\frac{4}{5}$ of a maund is worth Rs. 45, what is the price of $\frac{1}{4}$ of a maund?

2. Reduce $\frac{1}{303}$ to a decimal; ·019 to its lowest terms.

3. What is the expense of matting a room 31 ft. 5 in. long by 20 ft. 4 in. wide, the mat costing 14 annas per 12 square láth (linear láth = 18 inches)?

4. In what time will Rs. 8,500 amount to Rs. 15,767, 8 as. at 4½ per cent. per annum?

5. A person owes the sums of Rs. 31,500 and Rs. 8,500 ; and his property only amounts to Rs. 14,125. How much is he able to pay in the rupee ; and what is the loss upon the second debt ?

XVII.—(1874).

1. What fraction of $\frac{2}{7}$ of a rupee is $\frac{4}{6}$ of Rs. 5 ; and what proportion does their difference bear to their sum ?

Divide 999·666 by ·00036 ; and 2·3171428 by 10·2142857.

2. When rice is 10 seers the rupee, nine persons can be fed for 30 days at a certain cost· For how many days can six persons be fed at the same cost when rice is 14 seers the rupee ?

3. A wooden box 3 ft. 8 in. long, 2 ft. 3 in. high, and 2 ft. 4 in. wide, is made of board one inch thick. Find the quantity of wood used ; and the cubical contents of the box.

4. It is said that 240,000 letters are posted in Berlin daily, 16·6 per cent. of which are town letters. This gives one letter for every three persons in Berlin ; what is its population ?

5. What sum will amount to a *lakh* of rupees in ten years at 5 per cent. simple interest ?

Find the discount on Rs. 1,308 due two years hence at $4\frac{1}{2}$ per cent. per annum.

XVIII.—(1875).

1. Simplify $\dfrac{17}{7 + \dfrac{3}{4 - 2\frac{1}{4}}} \times \dfrac{2021}{2193} \div (1\frac{27}{43} - \frac{18}{18})$.

Find the value of $\frac{3}{24}$ of 17 Rs. 6 as. 4 p. + $3\frac{7}{8}$ of Rs. 12 5 as. $11\frac{1}{4}$ p. + Rs. 5·49583 ; and extract the square root of ·049 to four places of decimal.

2. A person received on the death of his aunt $\frac{7}{10}$ of her property and spent ·54 of it in paying off his debts ; what fraction of his aunt's property did he then possess ?

3. A room is 30 ft. long, 22 ft. wide, $18\frac{1}{4}$ ft. high, and has 5 doors and 3 windows ; find the expense of colouring the walls at 3 annas per sq. yd., deducting 30 sq. ft. for each door and window.

4. Find the *present worth* of Rs. 19,021 due 4 years thence at 3¾ per cent.

5. If Rs. 16,430 be invested in the Government 4½ per cent. loan at 106, what is the monthly income thence derived? Supposing that the loan is paid off at par in, 10 years, what would be the rate of simple interest (per cent. per annum) on the sum invested?

XIX.- (1876).

1. Simplify $\dfrac{5\frac{9}{7} - 3\frac{2}{4} + 4\frac{1}{14}}{3\frac{1}{8} + \dfrac{1 + \frac{1}{4}}{2 - \frac{5}{8}}}$.

Find the value of $\frac{5}{16}$ of 16 Rs. 14 as.—$1 \cdot 14$ of 5 Rs. 0 as. 3 p. $+ 1\frac{5}{8}$ of 9 Rs. 6 as. 6 p.

Reduce (16·05—6·25) of a rupee to the decimal of 22 Rs. 1 anna.

2. An equal number of men, women, and boys earned 39 Rs. 6 as. in seven days. Each boy received 2 as. a day, each woman 3 as. 6 p., and each man 4 as. 6 p. How many were there of each?

Find the square root of 531·065 to five places of decimals.

3. How many yards of matting 2 ft. 4 in. wide will be required for a square room, whose side is 9 ft. 4 in.? And what will be the price of it at 2 as. 3 pie per yard?

Find the value of 33 cwt. 3 qrs. 7 lbs. at £6. 7s. 8d. per cwt.

4. If 4,000 men have provisions for 190 days, and if after 30 days 800 men go away, find how long the remaining provisions will serve the number left.

5. At what rate per cent. simple interest, will 1,462 Rs. 8 as. amount to 1,725 Rs. 12 as. in 4 years?

XX.—(1877).

1. Simplify $\dfrac{\frac{1}{4} + \frac{3}{8}}{4 - \frac{5}{8} \text{ of } 5\frac{1}{2}} \div \dfrac{\frac{3}{4} + \frac{1}{4}}{\frac{7}{10} \text{ of } 4\frac{1}{2} - 2\frac{1}{2}}$;

and find the value of $\frac{5}{16}$ of 16s. 11d. $+ \frac{3}{8\frac{1}{2}}$ of 1l. 1s. 4d. $+ 3 \cdot 23l$.

2. Find by practice the value of 739½ maunds of sugar at Rs. 1,231. 4 as. per hundred maunds.

3. * Find the discount on 453*l*. 15*s* due 6 years hence at 3½ per cent.

4 A man sells 3 per cent. stock at 75, and invests the proceeds in 5 per cents. ; at what rate must he buy them in order that his income may be the same as before ?

5. If 7 men and 5 boys can reap 168 acres in 18 days, how many days will 15 men and 5 boys take to reap 700 acres, one man being able to do three times as much work as a boy ?

6 In a rectangular area, 100 yards long and 50 yards broad, there are two paths crossing one another, each parallel to one side of the rectangle, and each 4 yards broad. Find the cost of paving the area with stone at 12 annas per square yard, and of covering the paths with gravel at 6 annas per square yard.

XXI.- (1878).

1 Calculate to three places of decimals the value of $\dfrac{180 \times 36}{3\cdot14159}$.

2 Calculate to five places of decimals the square root of $1 + (\cdot067)^3$.

3 Reduce 483 R. 11 A. 6 P. to the decimal of 1,290 R. 1A. 4P.

4 Find the simple interest on 757 R. 4 A. 3 P. for 343 days at 3½ per cent. per annum.

5 Add together $\frac{1}{120}$, $\frac{1}{5010}$, $\frac{1}{10320}$, $\frac{1}{720}$. Express your answer as a decimal.

6 Find, by practice, the value of 99 cwt. 3 qrs. 27 lbs. at 5*l*. 2*s*. 8*d*. per cwt.

XXII.—(1879).

1 What is the local value of each of the figures composing the number 456·654 ?

2 Rs 49 was divided amongst 150 children, each girl had as. 8, and each boy as. 4, how many boys were there ?

3 Simplify—

(a) $8 - 8 \times \dfrac{2\frac{1}{6} - 1\frac{3}{4}}{2 - \dfrac{1}{6 - \frac{1}{6}}}$.

(b) $\frac{1}{8} + \frac{1}{4} + \frac{1}{4} - \frac{1}{4} \times / \frac{1}{4} - \frac{1}{8}.$

(c) $\cdot 15\dot{9}\dot{0} \times \cdot 47\dot{2} \div 2\dot{\cdot}\dot{7}.$

(d) What decimal of 4*l*. 3*s*. 4*d*. is $\frac{1}{1800}$ of 5*l*. 8*s*. 4*d*. ?

4. A tank 75 yards long, 50 yards broad, and 11 feet deep, is full of water : how many times can each of 16 water-carts, length 5 feet, breadth 4 feet, and depth 27 inches, be filled from the tank before the water in it falls 6 inches ?

5. If 17 men can build a wall 100 yards long 12 feet high and 2½ feet thick in 25 days, how many will build a wall twice the size in half the time ?

6. Find the change of income when a person transfers 2,616*l*. 5*s*. from the 5 per cents. at 95½ to the 4 per cents. at 83. Brokerage as usual.

7. In a game of skill A can give B, and B can give C, 10 points out of a game of 50 : how many should A give C ?

FIRST EXAMINATION IN ARTS.

ARITHMETIC.

1861. 1. What decimal of £2. 10s. is 3s.6d ? Divide 18s. 4d. by 2s.

1862. 1. How much money must be invested in the 3 per cent. consols when they are at 92¼, to produce the same income as would be produced by 1500l. invested in the 3½ per cents. at 95.

1863. 1. If 48 men working eight hours a day for one week can dig a trench 235 feet long, 40 wide and 28 deep ; in what time can 12 men working 10 hours a day form a Railway cutting 156,060 cubic yards? A. week = 6 working days.

2. What is the difference in value between 1,000l of 3 per cents. at 72 and 1,000l of 4 per cents. at 90?

1864. 1. The length and breadth of an enclosure which is in the form of a parallelogram are respectively equal to 47 yds. 2 ft. 4 in. and 22 yds. 2 ft. 11 in. what should be the breadth of another equiangular enclosure (which is also a parallelogram) if its length is 63 yds. 1 ft. 5 in., and its area is ⅜th of the former ?

1865. 1. Gold is sold at the Mint at 3l. 17s. 9d., per oz. and is mixed with alloy, worth 5s. 2d ,per oz., in the ratio of 11 : 1. If sovereigns be coined of this mixture, each weighing 5dwts, 3·47 grs. what is the Mint profit per 100 sovereigns ?

1866 1. A person has 24,180 Rupees to invest, the 5½ per cent. Government Loan being at 108, and the 6 per cent. Municipal Loan of 1,000 rupees being at 1020 ; find how he must divide his capital between the Government and Municipal Loans, that he may obtain the same income from each.

1867. 1. The length of the Eastern Bengal railway being 110
miles and the capital employed in its construction
1,500,000*l*., what must be the gross annual traffic re-
ceipts per mile in order that a dividend of 5 per cent.
may be paid to the shareholders after allowing 45 per
cent. of the gross receipts for current expenditure?

1868. 1. A person in India sells a bill on London for 358*l*. pay-
able at 3 months' s.ght at the rate of 1*s*. 10½*d*. per
rupee; what does he receive? The purchaser in Lon-
don requires payment on presentation; what amount
does he receive after discount at 5 per cent. has been
deducted?

1869. 1. The expenses of a family when rice is at twenty
seers for a rupee are fifty rupees a month; when rice
is at twenty-five seers for a rupee the expenses are
forty-eight rupees a month; what will they be when
rice is at thirty seers for a rupee?

1871 1. A man left 30,000*l*. stock in 3 per cent Government
securities, to be divided among his three sons in the
proportion of their ages, which were fifteen, eight
and seven years respectively; afterwards when these
securities stood at 10 discount the eldest son sold
out, and invested the proceeds in 6 per cent, Bank
shares at par. By how much did the annual income
of the eldest then exceed that of the youngest son?

1872. 1. The gallon contains 277·27, cubic inches, and a cubic
foot of water weighs 62·42lbs. Find the weight of
a pint of water to two places of decimals.

1873 1. I pay Rs. 51,000 to a bank for a bill of exchange pay-
able in London. The rate of exchange is 1*s*. 10½*d*.
for the rupee, and the bank charges me 2 per cent. o.1
the amount payable in England. How much will my
agent in London receive?

1874. 1. A bag contains 160 coins consisting of half-crowns,
shillings, sixpences, and fourpences, and the values of
the sums of money represented by each denomination
of coin are the same; how many of each are there?

1875. 1. A rectangular swimming bath is 60 ft. long and 40 ft.
broad; it can be filled by a supply-pipe in 5 days
and if 6,000 cubic feet of water be thrown in, the
rest can be filled in 3 days 18 hours. Find the depth
of the bath

1876. 1. What is the discount on Rs. 3,500 due 9 months hence interest being reckoned at 4 per cent. per annum ?

2. A merchant bought a fifty gallon cask of wine for Rs. 741. Supposing it to have lost $3\frac{1}{2}$ gallons, at what price per dozen bottles (nine bottles holding a gallon) should he sell it in order to gain 15 per cent. upon the whole original cost ?

1877. 1. A contractor bought 275 sheep, and sold them for Rs. 596, 12as. at a gain of 24 per cent. what was the cost price of each sheep ?

1878. 1. Find the present value of 4,867l. 4s. due two years hence, at 4 per cent. compound interest.

2. A man invests Rs. 1,200 in 4 per cents. at 80, and at the end of the year sells out at 90; what is his gain per cent. ?

1879. 1. A merchant mixes 54 gallons of wine at Rs. 24 per gallon, with 36 gallons at Rs. 14 per gallon. How much water must be added to the mixture in order that by selling at Rs. 20 per gallon he may gain 10 per cent. ?

2. At what rate per cent, compound interest, will 157l. amount to 192l. 18s. 9d. in two years ?

3. Find the value of $\left(\dfrac{2+\sqrt{12}-\sqrt{27}}{2+\sqrt{48}-\sqrt{27}}\right)^{\frac{1}{2}}$ to three places of decimals.

CALCUTTA UNIVERSITY
L. C. E. EXAMINATION PAPERS.

ARITHMETIC.

(I.)

One pound Troy of standard silver is coined into 66 shillings; calculate the weight Avoirdupois of £145, 17s 6d. in silver.

Find the value of —

(i) 5 cwt. 2 qrs 5 lbs. at 2 Rs. 5 as per lb.

(ii) ·75 of 6s. 8d—1·843 of 4s.+3·9796 of 2s.

3. Divide 18·'5' by 34 06 and 9·0072 by ·'07' each to five places.

4. Find the cube root of 29567 to 3 places of decimals, and the square root of ·00000182250.

Find by duodecimals, the contents of a room, whose length is 12 feet 3 inches, breadth 6 feet 4 inches, and height 10 feet 8 inches, giving the answer in cubic yards, feet, and inches.

6. Calculate the present worth on the 10th January of a bill for £1570 10s. 6d. drawn 30th December at 5 months, at 3¼ per cent.

7. If 15 men, working 8 hours a day, can complete a given work in 36 days, how many boys will be required to complete the same work in 19 days of 6 hours each. Two men being able to do the work of three boys?

(II.)

1. Simplify 1⅓ of 2⅘ + 6⅔ ÷ 2¼ — $\left\{ 5\frac{1}{3} + \frac{·24 + ·5\dot{3}}{2\frac{1}{3} - ·6\dot{4}} \right\}$.

2. Find the cost of carpeting a room, 18 ft. 9 in. long and 17 ft. 6 in. broad, with carpet 2 ft. wide at Rs. 2, 6as. a yard.

3. . If a cubic foot of gold be made to cover uniformly and perfectly, 432,000,000 square inches, find the thickness of the gold.

4. If 12 furnaces consume 12 tons 9 cwt. 21 lbs. of coal in 10 hours, how long will 7 furnaces be in consuming 15 tons?

5. Bank of Bengal shares of Rs. 1,000 are selling at Rs. 1,750 a share, and 6 per cent. Municipal debentures at Rs. 150. If the Bank gives a dividend of Rs. 100 a share per annum, find the difference of income of two investors of Rs. 50,000, one of whom buys Bank shares, and the other debentures.

(III.)

1. Extract the square root of 105310·89386896.

2. Reduce 0·891 and 0·73·891 to equivalent vulgar fractions.

3. If 120 men, in 3 days of 12 hours each, can raise an embankment 30 yards long, 2 feet broad, and 4 feet high; how many men will be required to raise an embankment 50 yards long, 6 feet high, and 1½ yards broad, in 9 days of 15 hours each?

4. Find the value, in vulgar and decimal fractions, of :—

$$\frac{2\frac{1}{7}\times\frac{5}{9}\times 3\frac{1}{4}}{2\frac{5}{8}\times\frac{4}{7}}.$$

(IV.)

1. Find the value of $\dfrac{1\frac{4}{17}-6\frac{1}{8}}{3\frac{3}{8}-1\frac{4}{15}} + \frac{3}{11}$ of $(2\frac{2}{3}-\frac{3}{4})- \dfrac{1\frac{3}{4}}{12}$; and

reduce ·909 × ·95 of 10s. 6d. to the decimal of 1l. 5s. 3d.

2. The population of Great Britain in 1851 was 21121967, and the increase during the previous half century had been 93·47 per cent., what was the population of 1801?

3. Divide 1215013·8 by 2·023 and ·000072072 by ·000012. Find the fraction corresponding to 1·01, and divide 27·36 by 3·109.

4. In paving a court-yard 1296 bricks are employed, the exposed surface of each brick measuring $9\frac{1}{2}$ in. by $4\frac{1}{2}$ in.; how many tiles 6 in. square would be required for paving a yard one-ninth of the size of the former?

5. If the simple interest on Rs. 1,250 for 3 years be Rs. 131-4, what will be interest on Rs. 2,000 for 5 years at the same rate?

6. There are two fields whose lengths are 150 yds. and 244 yds. and the breadth of the second half as great again as that of the first; these are respectively dug by men and boys who each take a strip of one given breadth. If the men be paid 49*l*. 9*s*. 7*d*., what will be due to the boys, the workmanship of each of these being $\frac{4}{5}$ths as good as a man's?

(V.)

1. Simplify $\dfrac{\cdot02\times\cdot9\times15-\cdot14\times\cdot06\times\cdot03+\cdot13\times\cdot01\times\cdot04}{\cdot05\times\cdot04\times\cdot03}$, and

take the square root of $\cdot049$ to 4 places of decimals.

2. If 21 men can earn Rs. 147, 14as. in 30 days, how much can 100 men earn in 57 days?

3. A room is 40 ft. long, 20 ft. 6in. broad, and 18ft. 9in. high and has 6 doors, each measuring 12ft by 5ft.; find the cost of plastering the walls at 3as. a square yard.

4. What sum must a person invest in the 4 per cents, when they are selling at $94\frac{1}{4}$, in order to get a clear income of Rs. 2,500 per annum?

5. A shop-keeper buys 4,246 yds. of cloth for Rs. 3,378. 12as.; at how much per yard must he sell it to make a profit of $23\frac{1}{2}$ per cent?

(VI.)

1. Simplify $\dfrac{1\frac{3}{8}}{8+\dfrac{1}{3\frac{1}{3}}} + \dfrac{1\frac{3}{4}\text{ of }4\frac{3}{7}}{1\frac{5}{8}\text{ of }3\frac{3}{4}} + \dfrac{5\frac{3}{4}\text{ of }7\frac{3}{8}}{8\frac{7}{24} - 3\frac{5}{12}}$.

2. Extract the square root of $\cdot0000811801$. Divide $1\cdot54$ by $\cdot11$ 154 by $\cdot07$; and $15\cdot4$ by $\cdot77$.

3. If the cost of 11 miles of iron rails be Rs. 55,000 when iron is selling at Rs. 95 a ton, what will be the cost of 19 mile of the same rails when iron is selling at Rs. 105 a ton?

4. The French metre = 39·370089 English inches, and the metre is the ten millionth part of the distance along a meridian from the equator to the pole; find the length of the meridian in miles.

5. What amount must be invested in the 4½ per cent. stock at 103¾, in order to obtain, after deducting an Income-tax of 3½ per cent., a clear income of Rs. 4,000 a year?

6. It takes 5904 tiles, each measuring 6 in. by 10 in. to cover the floor of a room 120 feet long; what is the width of the room? and what will be the cost of laying down the tiles at 2as. 6 pie the square yard?

(VII.)

1. Simplify $3\frac{1}{3} \div \frac{1-1\frac{3}{4}}{\frac{1}{4}-\frac{1}{3}} + (\frac{1}{2}+\frac{1}{4}+\frac{1}{8}) \div \frac{1}{3} + \frac{1}{5} + \frac{1}{4}.$

Divide 12150138 by 2·023 and take the square root of ·00011025.

2. A tradesman gains 6 per cent. by selling an article for Rs 795. how much per cent. does he lose by selling the same for Rs. 690?

3. A person invests Rs. 50,000 in 4½ per cents. at 105 and Rs. 50,000, in 4 per cents. at 98, what is his net income after deducting an Income-tax of $1\frac{1}{16}$ per cent?

4. The construction and rolling stock of a railway 120 miles long cost £11000 a mile. If the working expenses absorb 45 per cent. of the receipts, what must be the annual gross receipts per mile in order to pay a dividend of 5 per cent. on the capital?

5. The external length, breadth and height of a wooden box are 18, 10 and 6 inches respectively, and the thickness of the wood is half an inch, when the box is empty it weighs 15 lbs. and when filled with sand 100 lbs. Compare the weights of equal bulks of sand and wood.

1. Multiply the difference between $\frac{7}{11}$ and $\frac{101}{101}$ by $2\frac{2}{3}+1\frac{1}{3}$: and the result by the difference between $2\frac{4}{5}$ and $2\frac{4}{11}$.

Divide $\dfrac{\cdot 052}{1\cdot 3}$ of $1\cdot 56$ by $\sqrt{\dfrac{\cdot 0624}{14\cdot 4}}$ of $25\cdot 92$.

2. Find the value of 4,320 things at Rs. 2-12-6 each : and of 5 acres 2 roods 4 poles $4\frac{1}{2}$ yards at Rs. 10 per rood.

3. Find the square roots of the sum and difference of 99935440 and 117391124.

4. Two pipes, A and B, fill a cistern in 25 and 30 minutes respectively. Both pipes being opened find when the first must be closed that the cistern may be just filled in 15 minutes.

5. Supposing a gallon of water to contain $277\frac{1}{4}$ cubic inches : find what number of gallons of water would cover a square mile to the depth of 5 inches.

6. A person sells out Rs. 50,000 of 4 per cent. securities at $102\frac{7}{8}$ and invests the proceeds in 6 per cent. municipal debentures at 110 : after deducting an income tax of 2 pies in the rupee, what is the alteration in his income ?

(IX.)

1. In working a question in subtraction, explain what is meant by the unsuitable phrases ' borrowing' and 'carrying.'

2. Divide 1,007 farthings by 48, using the factors 3, 2, 4 and 2, and show clearly what is the value of the final quotient and of each remainder.

3. Multiply 6,372 and 6 0,072 by 567, and explain why the difference of the two products is divisible by 11 and by the squares of 7 and 10, and by the fourth power of 9.

What change would occur in these factors if the two zeros instead of being in the centre of the digits 6, 3 and 7, 2, occupied some other position still being together ?

4. In English gunpowder 75 parts by weight are saltpetre, 10 parts sulpher, and 15 parts charcoal. How many pounds weight of each ingredient are used in the manufacture of 16 cwts. of gunpowder ?

5. Show how to reduce circulating decimals to vulgar fractions. Subtract $\cdot 03$ from $\cdot 0\dot{3}$ and divide the result by $\cdot 10\dot{2}$.

6. Define the terms 'interest' and 'discount,' and show by general reasoning that the discount of a sum due at the expiration of a certain time is less than the interest on that sum for the same time by the interest on the discount.

The discount and interest on a certain sum for the same time are £22 and £24 respectively, find the sum.

(X.)

1. What is the difference between the values

(i) of $\dfrac{2\frac{4}{5} \text{ of } 5\frac{1}{3}}{27\frac{1}{2}}$ of Rs. 11-4as. and $\dfrac{5\frac{1}{15}}{2\frac{1}{2}+3\frac{3}{4}}$ of Rs. 6-4as.

(ii) of ·856 of 2 cwt. 26 lbs. and 3·227 of 2 qrs. 10 lbs.

2. Find the square roots of $39\frac{1}{16}$ and ·00255025.

3. What is the value of a block of certain material 5 ft. 3 in. long, 2 ft. 4 in. wide and 10 in. thick, worth Rs. 42 a cubic foot?

If the block weigh a cwt., what will one of the same material 7 ft. long, 1 ft. 9 in. wide and 10 in. thick weigh?

4. The price of rice being raised 50 per cent., by how much per cent. must a house-holder reduce his consumption of that article so as not to increase his expenditure?

5. A merchant buys 5,000 maunds of rice, one-fifth of which he sells at a profit of 5 per cent., one-fourth at a profit of 10 per cent., and the remainder at a profit of 16 per cent. If he had sold the whole at a profit of 15 per cent., he would have made Rs. 438-12as. more, what was the cost of the rice per maund?

6 Two cogged wheels, of which one has 16 cogs and the other 27, work in each other : if the latter turn 80 times in three quarters of a minute, how often does the other turn in 8 seconds?

(XI.)

1. Find the value of $\dfrac{1\frac{1}{4} \div 1\frac{1}{3}}{\frac{3}{4} \text{ of } \frac{3}{4}+10\frac{1}{4}} \times \dfrac{1\frac{1}{2} \text{ of } 4\frac{1}{2}}{6\frac{1}{8} \text{ of } 5\frac{1}{2}}$ of Rs. 50.

Divide 6400 by ·04096 : and reduce 3 hours, 42 minutes, 39 seconds to the decimal of a year.

2. In a field of cabbages the distance between the rows of cabbages is 2 feet, the distance between the cabbages in a row is 9 inches; how many cabbages are there in an acre?

3. If 81 gallons of water will fill a cistern 4 feet 4 inches long, 2 feet 8 inches broad, and 1 foot 1½ inch deep, how many cubic inches are contained in a pint?

4. If 22 men can dig a trench 420 yards long, 5 wide, and 3 deep, in 350 days of 9 hours each, in how many days of 11 hours each will 250 men dig a trench 210 yards long, 3 wide, and 2 deep?

5. Twelve years ago, A had Rs. 13,000, and B had Rs. 9,100. A has been more fortunate than B, and gained 3 per cent, where B gained 1 per cent. B has now doubled his capital, how much has A got?

6. One-third of a population can read: of the remainder 45 per cent. can read and write; of what still remains, 9 per cent. can read, write, and count: the balance is 500,500, who can neither read, write, nor count. Find the total population.

(XII.)

1. Simplify
$$\frac{1\frac{3}{8} + 7\frac{1}{2} \times 1\frac{1}{11} - 9\frac{1}{2}}{\frac{4\frac{3}{4}}{3\frac{1}{4}} \text{ of } (5\frac{1}{2} - 3\frac{7}{10})}.$$

Reduce Rs. 6, 10 as. 8, p. to the fraction of Rs. 7, 14 as. 8 p.; and 7 oz. 18 dwts. 15 grs to the decimal of a pound.

2. Extrat the square roots of $\frac{5}{8}$ and 5,036 to four places of decimals.

3. Find by duodecimals how many cubic feet are contained in a beam 25 ft. 5 in long, 1 ft. 7 inches broad, and 1 foot, 2 inches thick.

If an inch in thickness be taken off from each of the four sides, the length of the beam remaining the same, find how much wood has been removed.

4. A share-holder in a commercial company receives one year a dividend of 5 per cent. on his shares. The next year he receives a dividend of 7½ per cent., and finds that he is Rs. 412, 8as. richer. Find the amount of his shares.

5. The diameter of a fore-wheel of a carriage is 1½ feet, and that of the hind-wheel is 3 ft.; how far will the carriage have

travelled when the fore-wheel has made 100 more revolutions than the hind-wheel; (the circumference of a circle: diameter :: 3·1416 : 1.

6. A merchant sells 60 maunds of rice at a profit of 8 per cent. and 94 maunds at a profit of 10 per cent.; if he had sold the whole at a profit of 9 per cent. he would have received 17 annas less than he actually did; how much per maund did he pay for the rice?

(XIII).

1 Simplify (i) $\frac{1}{4\frac{2}{3}}$ of $\frac{4\frac{3}{4}}{2\frac{1}{4}}$ + $\frac{2}{4\frac{1}{4}}$ of $\frac{1\frac{5}{8}}{1\frac{3}{5}}$ — $\frac{2\frac{3}{7}}{18}$.

(ii) $\frac{3}{8}$ of Rs. 2, 3 as. + $\frac{19}{2}$ of 2·43 of Rs 5 + ·05 of Rs. 11.

Express Rs. 6-5 as 10$\frac{3}{4}$ p. as a fraction of Rs 9-8 as· 10 p.

2. Divide 06735 by ·125. Extract the square roots of ·125 and 1·21.

Find the side of the cube which contains 18 solid feet and 1664 solid inches.

3 If the gas for 5 burners 5 hours every evening for 10 days. cost Rs. 3·12 as., what will be the cost of 75 burners which are lighted 4 hours every evening for 15 days?

4. A man sells a horse for Rs. 372$\frac{3}{4}$ and loses Rs. 13 12as. per cent on what the horse cost him; what was the original cost?

5 What sum of money will amount to Rs. 69,996 9as. 7·2 p in 2 yrs., reckoning compound interest for one year at 3$\frac{1}{4}$ per cent. and for the other at 4 per cent. per annum?

6 The debts of a bankrupt amount to Rs. 21,345 4as. and his assets consist of property worth Rs. 9,167 10as. 8 pie and an undiscounted bill of Rs. 5,130 due 4 months hence, simple interest being reckoned at 4 per cent. How much in the rupee can he pay his creditors.

ENTRANCE EXAMINATION PAPERS.

ARITHMETIC.

I.—(1857).

1. Simplify the expression $(\frac{2}{3} - \frac{1}{7}) \times (\frac{2}{5} + \frac{5}{7}) \times (2\frac{8}{11}) + \frac{1}{5}$.

2. Divide ·000247 by ·013.

3. What is the equivalent in Indian coin, of 39*l.*—5*s.*—9¾*d.* when a rupee is worth 2*s.* 0¾*d* ?

4. Extract the square root of 187·9641·

5. A tank is 300 yards long and 150 yards broad; with what velocity per second must water flow into it through an aperture 2 feet broad and 1½ feet deep, that the level may be raised 1 foot in 9 hours?

6. Find the interest of 250*l* for 3½ years at 4½ per cent. simple interest·

II.—(1858).

1. A company of 87 men have subscribed each a month's pay amounting to Rs. 13-11-7, for the benefit of the widows of their deceased comrades. There are 24 applicants; what is each widow's share?

2. A cubical tank 24 feet long, 18ft. 6in. wide, and 12 feet 4in. deep, is filled with water. Find the weight of water supposing that a cubic foot weighs 1000oz. How long will it take to discharge itself at the rate of 15 gallons a minute assuming that a pint of water weighs 1℔ ?

3. A rectangular field is $\frac{2}{11}$ths of a mile long and $\frac{4}{11}$ths of a mile wide, find the length of a line joining two opposite angles.

4. Find the number of degrees, minutes and seconds in an arc of a circle which is equal in length to its radius, the ratio of the diameter to the circumference being 1 : 3·14159.

5. What must I pay for a bill of exchange on London, for 7*l* 15*s* 6*d*, the exchange being at the rate of 1*s* 10¾*d* for the Rupee?

6 A person having Rs. 8,500 in 4 per cents Government bond sells out when they are at 8¼ per cent. discount, and with the amount thus realized purchases 5 per cent bonds, which are at 6⅜ per cent. premium; what does he gain or lose in annual income by the change?

MÁDRAS UNIVERSITY

MATRICULATION EXAMINATION PAPERS.

ARITHMETIC.

I.—(1859).

1 In Long Multiplication the general product is the sum of several partial products. Illustrate this in the example. 2359×576; and write down, separately, the several partial products with their factors.

2 The receipts on the Madras Railway for a certain week in January 1859, when there were 96 miles open, were Rs. 9,554-3-10; for the corresponding week in 1858, when there were 81 miles open, they were Rs. 8,554-6-0. Compare the average Receipts *per mile* for the two years.

3 State the Rule for division of Vulgar Fractions, and prove it, taking an example.

4 First multiply, and then divide ·2 by ·03, and verify your results. Finally find the sum of their square roots to three places of decimals.

5 The French unit of linear measure is a *metre*; equal to 39·371 English inches; the square formed on a line of 10 metres (called an *are*) is the French unit of surface. Find the equivalent in English square measure, of a hecature (100 ares).

6. The number of pupils in a school is 287, composed as follows; Hindoos 196, Mohammedans 63, Christians 28. The average daily number of absentees is 58; *i. e.* Hindoos 37, Mohammedans 16, Christians 5. Find, to the first place of decimals, the percentage of *attendance* both on the aggregate, and of each class of pupils.

3

II.—(1860).

1. Multiply 76489 by 743, and explain fully the various steps of the process.

   In what cases does multiplication increase, leave unaltered, diminish, the multiplicand.

2. Find the least common multiple of 2191, 1252, and 1878. Illustrate the proof of your rule by this example.

3. What decimal of 9s. 3d. will be equivalent to a Rupee, when the exchange is at 1s. 10¼d. P.

4. Find the vulgar fraction which will represent in the simplest manner

   $$\frac{5\cdot75}{4\cdot25}\text{of }\tfrac{1}{4}\text{'} \div \tfrac{6}{7} + \tfrac{4}{5} \times \tfrac{3}{5} - \tfrac{1}{2}.$$

5. Extract the square root of 1156·272016.

6. If a cloth 4 yards long and 15 inches wide, cost Rs. 3 5as.; how much should you give for a cloth 19 yards long, 12in wide; and every square inch of which is worth ⅔ths of the value of a square foot of the former?

III.—(1861).

1. A bankrupt is indebted to A, B, C, and D—A's debt is twice B's; B's three times C's; C's half D's. How much should each receive of assets to the amount of Rs. 45,680?

2. Add together ⅝, ₁₅/₁₂, ⅜ and ½ and fully explain the process.

3. Reduce to their simplest forms

   $$\frac{\tfrac{7}{4} - \tfrac{1}{4}}{3\tfrac{3}{4} + 4\tfrac{1}{2}} \text{ and } \left(\frac{9-4}{5} \div \tfrac{1}{2}\right)^3.$$

4. Multiply ·892 of Rs. 16-5-4 by 4·678.

5. How much should you pay for a bill on London for £647, when the exchange is at 1s. 11¼d.?

6. Divide 764·0468 by ·0007. Give the rule for the position of the decimal point in your quotient, and shew that the rule is correct.

7. What is the square root of ·004225?

8. If the daily wages of a labourer rise from four and three-quarters to six annas, what percentage of the increase in the price of food and other commodities will cause his position to be unaltered?

9 A gentleman buys a house for Rs. 24,650 and spends 23 per cent. in additions and improvements. At what monthly rental will he secure 8 per cent. per annum ou his whole investment?

IV.—(1862).

1. Explain the decimal system of numeration. Write in words 14006, 3179040601, and 17·0461.

2. "Multiplication is a shortened form of addition." Of all additions? or of some? and if only of some, of what kind?

   Do the two statements *twice two are four* and *four times five are twenty* rest upon the same ground? Could you shew, without reference to the multiplication table, that five times five must exceed four times six by one?

3. State and prove the rule for the division of vulgar fractions;

   divide $\frac{1\frac{4}{7}}{6\frac{2}{3}}$ by $\frac{19\frac{1}{4}}{\frac{7}{9}}$.

4. Find the greatest common measure of 323 and 391.

5. If, when the exchange is at 1s. 11½d. per rupee, you wish to remit Rs. 4,891-4-3 to London; what should be the amount of your bills in English money?

6. Reduce $\frac{4}{7}$ to decimals. Prove the correctness of your method.

7. Find the square root of 64·064.

8 A steam-ship whose speed averages 14 miles an hour, reaches a certain port in 12 days; how many days afterwards will a sailing vessel arrive, which started at the same time and sailed on an average 8 miles an hour?

9. A train has been travelling 20 miles an hour: the steam power is doubled, whilst from various causes the resistance of the train is increased by one-half. At what rate will the train now travel?

V.—(1863).

1. Divide 480813 by 245 in two ways,

   (1) by long division, (2) by factors.

2. Add together £7. .16. .9 ; £19 . . 0 . . 4 ; £3 2 . . 6½ ; Rs. 142-3-10 ; Rs. 354-4-8 ; Rs. 1,269-14-2 ; (1) in English money (2) in Indian money, one rupee being equal to two shillings.

3. Simplify the following fractions

   (1) $\frac{7887}{7953}$, (2) $\frac{3}{4}$ of $\frac{4}{5}$ + 8$\frac{1}{4}$ + $\frac{\frac{1}{2}-\frac{1}{3}}{\frac{1}{2}+\frac{1}{3}}$, (3) $\frac{3}{8}$ of Rs. 9 + $\frac{5}{8}$ of

   As. 10 — $\frac{2}{3}$ of pie 6.

4. Multiply 4·37 by 1·01 and divide 7·4 by ·018.

5. Reduce £56·125 to the ordinary notation.

6. Find the square root of (1) 127449 ; (2) of 12·7449 ; (3) of 2 to three places of decimal.

7. Shew that no number can be a perfect square which has an odd number of decimals after the point.

8. How must Rs. 1,075 be divided betwixt two persons, so that one may have twice as much as the other?

9. A sailing vessel reaches Madras from Calcutta in 6 days ; a steamer whose speed is to that of sailing vessel as 3 : 2 starts at the same time, but meets with detentions that average 6 hours daily.   Which will reach Madras first ? and by how much ?

VI.—(1864).

1. A man rides at the rate of 11 miles an hour, but stops 5 minutes to change horses at the end of the 7th mile ; how long will he take to go a distance of 94 miles ?

2. How are vulgar fractions compared in regard to magnitude ? Of the fractions $\frac{7}{13}$, $\frac{113}{133}$, which is the greater and what is the difference ?

3. A cubic foot of air weighs 1·29 oz. avoirdupois. What will be the weight of air in a room 18 feet broad, 30 feet long and 16 feet high ?

4. Simplify the expression

$$\frac{\frac{2}{3} + \frac{1}{3}}{\frac{1}{4} + \frac{1}{5}} + \frac{1}{3} \text{ of } \cdot 4.$$

5. What will be the cost of a beam of wood 14 feet long, 16 inches broad, and 9 inches thick, at Rs. 1-0-8 per cubic foot ?

6. Extract the square roots of $17\frac{9}{16}$ and $\cdot 015129$.

7. Find (by Practice) the value of 371 articles at 6s. 3d. each.

8. Express in a decimal form

$$3 + \tfrac{4}{15} + \tfrac{9}{1000} + \tfrac{17}{10000} \cdot$$

9. A train starts from A at 12 o'clock and runs towards C, which is 100 miles distant, at the rate of 30 miles an hour; at the same time the mail cart starts for C, from B, which is half way between A and C, and runs at 10 miles an hour; at what distance from C will it be overtaken by the train ?

VII.—(1865).

1. Find (by Practice) the value of $237\frac{1}{4}$ yds. of cloth at 1s. $10\frac{1}{2}d$. per yard.

2. A person goes into a bookseller's shop with a certain sum of money, and after buying 20 books at Rs. 2-4-0 each, finds that $\frac{3}{8}$ of his money remains. How much had he when he entered the shop ?

3. Reduce to their simplest forms each of the following expressions and show that the second is double of the first—

(1) $\dfrac{8\frac{1}{3}}{\frac{2}{3} \text{ of } 2\cdot25}$ of $\dfrac{\cdot1625}{\frac{1}{15} \text{ of } 5\frac{1}{4}} \div \left(\dfrac{2}{21} + \dfrac{7}{81}\right)\cdot$

(2) $\left\{ 37 + \dfrac{3\cdot70\dot{3}\dot{7}}{100} \right\} \times \cdot54.$

4. A room is 19 ft. 5 in. long and 16 ft. 7 in. broad and the cost of painting the walls at 7as. 6p. per square yard is Rs. 43-3-0. Required the height of the room.

5. Extract the square roots of $5\frac{3}{4}$ and $\cdot0045$, each to 4 places of decimals.

6. A merchant buys goods for £568. 4s. and sells half of them at a gain of 1d. in the shilling of the cost price, one-third of them at a gain of 2d. in the shilling and the remainder at a gain of £15-5s.-8d. How much per cent. does he gain on the whole transaction?

7. Express $\frac{4}{5}$ of 12s. 6d.+·625 of 7s. 6d.—·505 of 15s. 6d as a decimal of £1.

8. A person after paying an income tax of 1 anna in the Rupee. devotes $\frac{1}{16}$ of the remainder of his income to purposes of charity, and finds that he has Rs. 5,175 left; what is his income?

VIII.—(1866).

1. A person paid a tax of 10 per cent. on his income, and had Rs 15,000 per annum remaining. What was his income?

2. Find, by Practice, the time of building a wall 27 yards long by 6 feet high, of which one square yard is built in 3h. 18m. 45s.

3. How much will 3,630 square yards of land cost when an estate of 144 acres is worth Rs. 46,275?

4. Simplify the expression $\dfrac{\frac{5}{8} \text{ of } \frac{13}{25} + \frac{1}{7} \times 2\cdot3}{3-(\frac{2}{3} + \frac{7}{10}) + 2\cdot36}$

5. If 10 compositors, who can set 3 letters in 5 seconds, finish 27 pages in an hour and a half, how many compositors, who can set 5 letters in 6 seconds, will complete 50 pages in an hour?

6. What is the value of

 (a) $\frac{1}{4}$ of 1s. + $\frac{7}{10}$ of 2s. 6d. + $\frac{3}{5}$ of £1 expressed in the fraction of a guinea.

 (b) ·0625 of Rs. 10½?

7. Find the square root of (a) 53·4361 (b) ·187.

8. A can do a piece of work in 3 days, B can do 3 times as much in 8 days, and C 5 times as much in 12 days. In what time will they do it together, supposing them to work at the rate of 9 hours a day?

IX.—(1867).

1. One inch of rain falls on an acre of ground. How much will it weigh reckoning the weight of one cubic foot as 1000 ounces?

2. A person bought a horse for Rs. 750 and kept it 15 months. It cost during that time in gram Rs. 190-10-6; in servant's wages Rs. 135; and in other expenses Rs. 35-14-6. He sold it for Rs. 625; what was the average monthly cost of the horse?

3. Reduce to its simplest form

$$\frac{\frac{5}{8} - \frac{2}{4}}{?}$$ and convert the result into a decimal.

4. A body of 3249 men is formed into a solid square. How many men will there be in each side?

5. What fraction of a Rupee and a quarter is $\frac{1}{7}$ of $\frac{2}{5}$ of Rs. 5-4?

6. Extract the square root of 196·1 to three places of decimals.

7. A merchant clears 20 per cent. on a gross income of Rs. 50,000. How much per cent. must he clear if he receives the same amount from a gross income of Rs. 40,000?

8. A ship captain owns $\frac{3}{4}$ of his vessel. In virtue of his command he receives $\frac{1}{25}$ of the profits, and of the remainder his share as proprietor. What proportion of the whole does he receive?

9. A person with a monthly income of Rs. 264 spends as much in four months as he earns in three. After twelve years he divides his savings among his three children in such a manner that the eldest has twice as much as the second, and thrice as much as the youngest. How much did each receive?

X.—(1868).

1. If 6 men can do a piece of work in 255 days, how many men can do the same in 17 days?

2. How much carpet $2\frac{1}{4}$ feet wide would be required for covering the floor of a room 28 feet long and $16\frac{1}{2}$ feet wide?

3.   Reduce to its simplest form

$$\frac{1\frac{1}{2} \text{ of } 2\frac{1}{4} \text{ of } 3\frac{1}{2} \text{ of } 4\frac{1}{5}}{3\frac{3}{4} \text{ of } 2\frac{4}{11}}.$$

4.   Find the square root of ·00826462810.

5.   A man buys 16ḷbs of tea at Rs. 2 As. 2 per ḷb, also 12ḷbs. at Rs. 2-5-4 per ḷb., and 24ḷbs at Rs. 2-6-10 per ḷb. At what price per ḷb. must he sell the mixture so as to gain Rs. 35-12 on the whole?

6.   If it is high water at noon on a certain day, find after how many days it will again be high water at noon, supposing the time of 'high water to be three quarters of an hour later every day.

7.   A crow wishing to quench its thirst came to a vessel which contained 28 cubic inches of water. The crow being unable to reach the water picked up several small stones, each three quarters of a cubic inch in size, and let them drop into the vessel until the water came to the top of the vessel. If the size of the vessel was such that it would exactly hold 73 cubic inches of water, find the number of stones dropped in by the crow.

8.   A book containing between 900 and 1,000 pages is divided into four parts, each part being divided into chapters. The whole number of *pages* in each of the four parts is the same. Each chapter in the first part contains 20 pages, each chapter in the second 40, each chapter in the third 60, and each chapter in the fourth 80. Find the whole number of chapters in the book.

XI.—(1869).

1.   Simplify $\left(\frac{1}{25} \times 3\frac{1}{4} \right) + \left(\frac{3}{5} \div \frac{27}{35} \right) - \left(\frac{1}{1\frac{1}{4}} - \frac{7\frac{3}{4}}{9} \right).$

2.   The difference in the values of the 2 shares into which a certain property is divided is £48·575 and one share is ·51 of the whole. Find the value of the property and of each share.

3.   What is the income corresponding to an Income Tax of 25 guineas at the rate of 7d. in the pound?

4.   Find to within a foot, the length of the fence enclosing a square field whose area is 3¼ acres.

5. A Barrack for 30 men is 73¼ feet long, and 24¾ feet broad; how high should it be to allow each man 1000 cubic feet of air or space?

6. A person sets out to walk 26 miles: for a quarter of the distance he goes at the rate of 5 miles an hour, for half the remaining distance at 4 miles an hour, and 3 miles an hour for the other half. State the exact time occupied in the journey.

7. The Fort Barracks are lighted with gas from 100 burners. Find the cost of lighting them per night of 10 hours, at the rate of 5½ Rupees for 1000 cubic feet of gas, assuming that for the first hours each burner consumes 1 cubic inch per second, and during the remainder of the night the light is so reduced that the consumption of gas by each burner is only ¾ths of that quantity per second.

8. If two Malabar miles are equal to 1 koss, and 7 Malabar miles are equal to 10 English miles, how many koss are there in 25 English miles?

9. A contractor bought 2250 parahs of unslaked lime at Madras at the rate of 45 Rupees for 100 parahs. On slaking it every parah gave 3 cubic feet of lime, but of this $\frac{1}{8}$th was unserviceable: the carriage of the remainder to the place where it was required (distant 18 miles) cost 4 annas per 100 cubic feet per mile. At what rate per cubic foot must he sell it there, in order to gain 90 Rupees on his outlay?

XII.—(1870).

1. Which is greater

$$\frac{7}{8} \text{ of } 1\frac{3}{8} - \frac{1\frac{3}{4}}{6\frac{3}{4}} \text{ of } 1\frac{9}{20} + \frac{3}{7} \text{ of } \frac{6\frac{5}{12}}{3\frac{3}{4}}$$

or

$$\frac{4}{5} \text{ of } 1\frac{3}{8} + \frac{6\frac{3}{4}}{1\frac{3}{4}} \text{ of } 1\frac{9}{20} - \frac{7}{8} \text{ of } \frac{6\frac{5}{12}}{3\frac{3}{4}}$$

and express the difference as a decimal.

2 Express as a fraction the difference between $\frac{3\frac{4}{4}}{4\frac{8}{8}}$ and 3·1416; and reduce 2 tons, 3 cwts. 2 qrs. 26·996954 lbs. to the decimal of a viss of 3·086 lbs.

3. A rectangular field, whose diagonal measures 825 feet, has one of its sides, ·75 the length of the other. Find the length of each side in yards, and the area in acres.

4. A person had a legacy left to him which he thus divided amongst 3 charities. To one he gave $\frac{3}{10}$, to the second $\frac{2}{7}$ of the remainder, and to the third $\frac{3}{4}$ of what now remained; and he then had 1,500 Rupees left. Find the amount of the legacy, and how much was given to each charity.

A creditor received on a debt of 3,600 Rupees a dividend of 9 annas 10 pice in the Rupee; and a further dividend of 6 annas 8 pice upon the remainder. What did he receive altogether, and what fraction was it of the entire debt?

6   A and B each lend £250 for three years. A lends at $4\frac{3}{4}$ per cent., simple interest, and B at $4\frac{1}{2}$ per cent, per annum, compound interest. Find the difference in the amount of interest they receive.

7   A contractor agrees to supply $10\frac{1}{2}$ lacs of bricks for a particular work. His bricks cost him $3\frac{1}{2}$ rupees per 1,000 to make, and of these $12\frac{1}{2}$ per cent., are rejected. How many bricks must he make in order to fulfil his contract, and what price per 1,000 must be put on those supplied in order to gain 25 per cent. on his outlay?

8   The distance by Railway from Madras to Salem is $206\frac{3}{4}$ miles. A Passenger Train travelling 20 miles an hour leaves Madras at 7 A. M.; and a Special Train at 10 A. M. the same day. At what rate must the latter travel, so as just to overtake the former at Jollarpett Junction (132 miles from Madras); and at what hour must a Goods Train leave Salem for Madras travelling 15 miles an hour, so as to reach Jollarpett at the same time as the other Trains?

9   Extract the square root of
$$\frac{17 \times 29\frac{4}{16}}{\cdot 000729}.$$

10. A work can be completed in 36 days by 30 men working 6 hours a day; in what time would 18 men and 60 women working 9 hours a day complete it; supposing that 3 men can do as much as 5 women; and that in the longer days a man does only $\frac{4}{5}$ per hour of what he does per hour in the shorter days?

XIII.– (1871).

1. A person mixes together 10lbs of tea at Rs. 1-4-0 a lb, 12lbs. at Rs. 1-6-0, and 14lbs at Rs. 1-8-0 a lb. He reserves 6lbs of the mixture for himself and sells the remainder at Rs. 1-13-4 a lb. How much does he gain?

2. (a) Simplify

$$\cfrac{1}{1-\cfrac{2}{2-\frac{1}{4}}} \qquad \left\{ \tfrac{1}{3} - (1+\tfrac{1}{11}) \right\} \div 3 \,(1 - \tfrac{4}{5} \text{ of } 2\tfrac{1}{4});$$

(b) Express $\tfrac{3}{4}$ of $\tfrac{9}{10}$ of £1.-10-0 $+$ $\tfrac{3}{4}$ of $\tfrac{5}{8}$ of 5s.-4d · -8$\tfrac{1}{2}$ of $\dfrac{1}{4\tfrac{1}{4}}$ of 5s. 3$\tfrac{3}{4}d$. as the fraction of 2s. 1$\tfrac{1}{2}d$.

3   A has shares in an estate to the amount of ·15+·36 of it, B has shares in the same estate to the amount of ·472 of it; find the difference in value between the properties of A and B, when ·056 of the estate is worth £373·3.

4   A reduction in the income tax diminishes a tax which is Rs. 15 when the tax is 8 pies in the Rupee by Rs. 3-12-0, what is the diminished rate of the tax in the Rupee?

5   23 cwts. 3qrs. 7lbs. are bought at £2 10s. 8d. per cwt. and 72 cwts. 8lbs. at £ 2-7-10 per cwt. Find by Practice the amount expended and give the average price per lb.

6   A person borrows £500 at 5 per cent. per annum. and subsequently £400 at 3$\tfrac{1}{2}$ per cent., if the amount of both sums 6 months after the latter was borrowed is £957, find the time for which interest is paid on the former sum.

7   A cask of 144$\tfrac{3}{4}$ gallons is bought for £50 and kept 10 years, during which $\tfrac{7}{15}$ of a gallon evaporated yearly; at what rate per gallon must the contents be sold so as to clear 20 per cent on the amount of the original outlay at 4$\tfrac{1}{2}$ per cent. per annum simple interest?

8   Water flows into a rectangular cistern whose dimensions are 12ft. 1in. long, 11ft. 8in. wide, and 5ft. 4in. deep through a pipe of 10 sq. inches aperture at the rate of 2$\tfrac{1}{2}$ft. per second, and flows out through an orifice at the rate of 2ft. 5·8in· per second; if the cistern is filled in two hours, find the size of the orifice.

9   A lump composed of gold and silver measures 6 cubic inches and weighs 100 oz., if a cubic inch of gold weighs 20 oz. and an equal bulk of silver 12 oz, find the weight of gold in the mixture.

10.   A train which travels at the uniform rate of 30·8ft. a second leaves Madras at 7 A. M; at what distance from Madras will it meet a train which leaves Arconum for Madras at 7-20 A. M. and travels one-third faster than it does, the distance from Madras to Arconum being 42 miles?

XIV.—(1873).

1. A person buys a piece of land at £ 25 an acre, and by selling it in allotments finds that the value increased by one-half, so that, after reserving 20 acres for himself, he clears £ 200 on his purchase money by the sale of the remainder. How many acres were there ?

2 Simplify

(a) $\left\{\dfrac{7}{5-\frac{2}{3}}+\dfrac{3-\dfrac{2}{3-\frac{3}{5}}}{4-\frac{3}{2}}\right\}-\frac{5}{7}$ of $\left\{\dfrac{1}{1\frac{1}{7}}+\frac{3}{8}\text{ of }\dfrac{3\frac{1}{3}-2\frac{1}{2}}{4\frac{7}{4}-2}\right\}$,

(b) Reduce $(\cdot57\dot{5}+16\times\cdot1\dot{5})$ of 4 viss to the decimal of $1\frac{10}{66}$ cwts , a viss being equal to 3lbs. 2oz. avoirdupois.

3. A vessel's cargo, $\frac{3}{4}$ of which is worth £ 6666·6, gets damaged, and the owner in consequence sells $\dfrac{\cdot8\dot{3}+\cdot041\dot{6}}{1\cdot05}$ of it for half the original value of the whole cargo. What is the value of the remainder at the same rate and what the loss on the whole cargo ?

4 Find how much rice a family requires monthly, when a reduction in the price from 7 to 10 measures for the rupee reduces the total monthly expenses from Rupees 31½ to Rs. 30.

5 A person going from Pondichery to Ootacamond travels 90 miles by steamer, 330 miles by rail and 30 miles by horse-transit. The journey occupies 30 hours, 50 minutes and the rate of the train is 3 times that of the horse-transit and 1½ times that of the steamer. Find the rate of the train.

6 A person bought 10 Bank of Madras shares at Rs. 1540 each and for 5½ years got interest on his investment at the rate of 5 per cent. He then sold his shares at a loss of 22½ per cent. How much did he make by the transaction and what rate per cent. per annum had he for his money ?

7. A person borrows two equal sums at the same time at 5 and 4 per cent. respectively, and finds that if he repays the former sum with interest on a certain date 6 months before the latter, he will have to pay in each case the same amount, *viz.*, £ 1100. Find the amount borrowed and the time for which interest is paid.

8. A dealer buys 10 horses at Rs. 400 each, 8 horses at Rs. 500 each, and 4 horses at Rs. 600 each. He keeps the horses for 6 months, during which each costs Rs. 15 a month, and then sells them clearing 12½ per cent., on his original outlay after paying all his expenses. Find the selling price.

9. A stream of water 8 yds. broad, at the surface and 6 yds. at the bottom and 2 yds. deep, flows at the rate of 1½ miles an hour into a tank 220 yds. long, and 56 yds. broad, which holds 74,250 tons of water. Find the depth of the tank and the time in which it will be filled, a cubic foot of water weighing 1,000 oz.

10. Two trains running at rates of 25 and 20 miles an hour respectively on parallel rails in opposite directions are observed to pass each other in 8 seconds and when they are running in the same direction at the same rates as before, a person sitting in the faster train observes that he passes the other in 31½ seconds; find the lengths of the trains.

XV.—(1874.)

1. Find the greatest number which will divide 201 and 671, having remainders 6 and 8 respectively; and the least number which when divided by 5, 7, and 9 gives in each case a remainder 4.

2. A wine merchant mixes together one pipe (126 gallons) of wine at £80, one at £90, and one at £100, and sells one-third of the mixture at 13s. 4d. a gallon: at what price per gallon must he sell the remainder so as to gain £34½ by the transaction?

3. Simplify :—

(a) $\left\{ \dfrac{2}{3 - \dfrac{1}{1-\frac{1}{2}}} - \frac{1}{3} \text{ of } \left(5 - \dfrac{2}{\frac{2}{3}-\frac{1}{5}} \right) \right\} \div \dfrac{\frac{1}{2} + \frac{1}{4}}{1\frac{1}{2}}.$

(b) $\dfrac{\cdot 1 \times \cdot 1 \times \cdot 1 + \cdot 01 \times \cdot 01 \times \cdot 01}{\cdot 2 \times \cdot 2 \times \cdot 2 + \cdot 02 \times \cdot 02 \times \cdot 02}.$

4. Find the value of ·428571 of £1·05 + ·38 of 1·5s., and express the result as the decimal of £43-2-6.

4

5. A barters sugar with B, for rice which is worth $1\frac{7}{8}$ annas a measure, but on weighing his sugar uses a false maund weight. B discovers this, and to make the exchange fair, raises the price of his rice to $2\frac{1}{2}$ annas a measure. Find the real weight of the false maund which A uses.

6. A certain sum put out at compound interest amounts in two years to £270·4 and in three years to £281·216. Find the sum and the rate per cent.

7. A person pays an income tax of 4d. in the £ during the first half of the year and of 3d. in the £ during the second half, and finds that owing to an increase in his income he pays the same amount of tax for the second as for the first half of the year. If his gross income for the year is £700, find his net income.

8. A cistern measuring 13 feet in length, 5 feet in breadth, and 4 feet in depth has a tap which, not being properly opened, discharges 54 gallons an hour less than it would otherwise do and empties the cistern in $7\frac{1}{2}$ instead of 6 hours. How many cubic inches are there in a gallon?

9. Gold costs £3-17-10$\frac{1}{2}$ per oz, and silver 5s. 6d.; in what proportion must these metals be mixed that a lb., of the mixture may be worth £32·5?

10. A peon walks from A to B at the rate of 3 miles an hour, and after transacting some business which occupies him an hour, returns to A by the tramway at the rate of 5 miles an hour. He then finds he has been absent two hours 20 minutes. Find the distance from A to B.

XVI.—(1875.)

1. A merchant purchases 231 gallons of spirit at Rs. 10-12-4 per gallon; 126 gallons at Rs. 12-11-7; and 70 gallons at Rs. 14-8-9; if he sell the mixture at Rs. 13 per gallon, how much will he gain by the transaction?

2. Define a decimal; and show how its value is affected by affixing and prefixing cyphers.

Reduce $\dfrac{1 + \dfrac{2}{3\frac{1}{4}}}{1 - \dfrac{2}{2\frac{1}{4}}} + \left\{ \dfrac{1 + \dfrac{4}{3}}{9 - \dfrac{1}{1 - \frac{1}{4}}} \right\}$ to a decimal,

and find the value of

$$\frac{\cdot 044 \times 2\cdot 1}{\cdot 0000\ 35} \div \frac{3\cdot 076923}{2\cdot 3 \times 5\cdot 6}$$

3. Express the sum of $\cdot 571428$ of a viss, $\frac{3}{8}$ of $\frac{1}{3\frac{3}{4}}$ of $\frac{317}{384}$ of a maund; and $\frac{3801}{10136}$ of a hundred weight as a decimal of one ton (one viss = 3 lbs. 2 oz.; one maund = $82\frac{2}{7}$ lbs.).

4. If 210 coolies in 7 days of 10 hours each dig a channel 1 mile long, 6 feet broad, and 2 feet deep; in how many days of 7 hours each should 35 coolies dig a channel 660 feet long, $7\frac{1}{4}$ feet broad, and $2\frac{1}{4}$ feet deep? and how many cubic feet does each cooly dig in an hour?

5. The expenses of a family when rice is 12 seers for a rupee are 50 rupees a month : when rice is 14 seers for the rupee the expenses are 48 rupees a month (other expenses remaining unalterable); what will they be when rice is at 16 seers per rupee?

6. What are the prime factors in 45090045, and what is the smallest whole number by which it must be multiplied in order to become a perfect square?

7. The cost of carpeting a room is £7-4-0, and of papering the same room, with paper at $2\frac{1}{2}d.$ per square foot, £10-12-6. The length of the room is 18 feet, and if the width had been 4 feet less the cost of the carpet would have been £1-16-0 less. Find the height of the room.

8. Find the sum for which the difference between the simple and compound interest at 5 per cent., per annum for three years is £12-4-0.

9. What length of wire will go round the edges of a cube the surface of which contains 187 yards 0 feet 54 inches. What is the least number of such cubes which will contain an exact number of cubes whose edges are 1 foot 3 inches?

10. A merchant's average rate of profit for five years was 5 per cent. on his capital, and for the first four years his average profit was four per cent. What was his rate of profit the fifth year?

XVII.—(1877.)

1. A merchant buys 264 gallons of spirit at Rs. 12-8-4¼ per gallon; 378 gallons at Rs. 9-10-7 per gallon: and 420 gallons at Rs 12-15-6¼ per gallon. If he sell the whole quantity at Rs. 12-4-0 per gallon, what profit will he make by the transaction?

2. If 2 men and 5 women can do a piece of work in 8 days of 9 hours each; how long will it take 3 men and 6 women to do a piece of work twice as great working 8 hours a day; the work of a man being double that of a woman?

3. Extract the square root of ·0002890: and find in yards to four places of decimals the side of a square field containing ·254 of an acre.

4. Find the value of ·016 of Rs. 260-2-6+·351 of Rs. 13-1-0 +1·00033 of Rs· 7-14-3.

5. A merchant buys cloth at such a price that by selling it at Rs. 2-3-0 per yard he will gain 5 per cent., on his outlay. What percentage will he lose if the cloth be sold at Rs. 1-13-0 per yard?

6. Find the interest (simple) at 4 per cent., per annum on Rs. 595-9 for 4 years and 17 weeks, reckoning 52 weeks equal to a year.

7. A sum of Rs. 18,240 is remitted to England at the rate of exchange of 1 shilling and 8¾ pence per Rupee, and is invested in 3 per cent., consols at 95. Find the yearly income in pounds sterling.

8. A man bequeathed $\frac{4}{13}$ of his estate to one son, $\frac{7}{13}$ of the remainder to another son, and the balance to his widow. The children's shares differ by Rs. 1,320; find the widow's share.

9 • A merchant buys in Madras 210 bags of rice at Rs 10-12-0 per bag of 164 pounds. He sends them by rail 320 miles at 6½ pies per ton per mile, but during the journey 7¾ pounds are stolen from each bag. Find at how many measures per rupee he must sell the remainder in order to clear Rs. 95-15-0 by the transaction.

(One measure = 3⅛ pounds.)

XVIII.—(1878.)

1   Find by *Practice* the value of

    (*a*) 9 tons 17 cwts. 2 qrs. 24 lbs. at Rs. 125-6-8 per ton.

    (*b*) 29,764 articles at Rs. 1-11-9¾ each.

2   The materials of an old building were sold for Rs. 1,500 upon condition that they should be removed within 30 days under a penalty of Rs. 10 per day for every day beyond 30 days. The purchaser employed 40 men at 3½ annas per day to do the work, and after selling the materials for Rs. 2,365, he cleared Rs. 190 by his bargain. Find the number of days the men were at work.

3   (*a*) Divide ·0576 by 180, and by ·018.

    (*b*) Find the value of

$$\frac{2\cdot8 \text{ of } 2\cdot27}{1\cdot3\ddot{6}} + \left\{ \frac{4\cdot4-2\cdot83}{1\cdot3+2\cdot629} \text{ of } 8\cdot2 \right\}.$$

4.   A and B enter into partnership; A supplies the whole of the capital, amounting to Rs. 45,000 upon condition that the profits are to be equally divided, and that B pays A interest on half the capital at 10 per cent. per annum, but receives Rs. 120 per mensem for carrying on the concern. Find their total yearly profits when B's share is equal to one-half of A's share.

5.   Find the difference between the *true* discount on Rs, 259·2. due two years hence, and the interest on the same sum for two years, allowing in both cases simple interest at 4 per cent., per annum.

6   A room, 21 feet long by 13½ feet wide is surrounded by
    walls 1½ feet thick, and 14 feet high. There are two doors
    each 4½ feet by 6 feet, and one window 3 feet by 4½ feet.
    Find (1) the cost of building the walls at the rate of
    Rs. 5-1-0 per cubic yard, and (2) the number of bricks each
    measuring 9 inches ×4 inches × 2½ inches, required for
    the work.

7. If 38 men working 6 hours a day can do a piece of work
    in 12 days, find in what time 57 men working 8 hours a
    day can do a piece of work twice as great, supposing 2
    men of the first set to do as much work in 1 hour, as 3
    men of the second set can do in 1½ hours.

8. Extract the square root of ·002, and of 764·9, each to
    four places of decimals.

9. A person's net income from 5 per cent. Government paper
    is Rs. 1,225 after paying income tax at the rate of 2 per
    cent. Find the number of shares of Rs. 1,000 each owned
    by him.

MADRAS UNIVERSITY

FIRST EXAMINATION IN ARTS.

ARITHMETIC.

I.—(1866).

1. State and prove the rule for pointing in division of decimals.

2. Find the value of ·16 of 1 acre, 2 roods + ·06 of 3 acres
    2 poles + ·142857 of 10 acres 3 roods 30 poles; and reduce
    5lbs. 7oz. 13grs. Troy to the fraction of 2lbs. 5dwts.

3. If Rs. 160-4as.-8p. are equivalent to £15. 15s. 6½½d. What is
    the value of a rupee?

4. Divide £1650 among A, B, C, and D, so that A may have half
    as much as B, B a third as much as C, and C a fourth as
    much as D.

On what sum of money will the Compound interest for 2 years be the same as the simple interest on £243 for 10 years, reckoning interest at the rate of 5 per cent. per annum?

Six men fire at a, target at intervals of 2, 5, 7, 10, 12, 14, minutes respectively. After what time will they *first* all fire simultaneously, and how many times will each man have fired?

A owes B £500, in liquidation of which debt he gives him a bill of £300 due 10 years hence, another bill due 4 years hence, and £133 6s. 8d. in cash. What is the value of the latter bill, interest being at the rate of 5 per cent. per annum, and allowing true discount.

Find the cube root of ·1539008560.

A, B, C, D working together can perform a piece of work in 8 days A and B together take twice as long as A, B, C, D together to perform the same work. A works during the whole of the day, B during three-fourths, C during a half, and D during ¼th of the day. In how many days will the work be finished?

A man invests £864 in the following manner. One half he invests in the 5½ per cent. at 8 premium, and the other half in Bank shares at 116 premium. After one year he sells out both his 5½ per cent. and also his Bank shares, the former now being at 12 premium, and the latter 130 premium and invests the whole of the proceeds in the 4½ per cent at 90½. His annual income is now £1 less than it was before. What rate of interest did the shares pay?

II.—(1867).

A can copy a certain manuscript in 17 hours by writing at the rate of 3 lines per minute, B can copy the same in 24 hours. After 476 lines have been copied by A, in what time can B finish it?

From a field containing 8 acres 26 poles 21¼ yards, are taken 40 plots of ground each equal in area to a rectangle 32 yds. long, 15¼ yds. broad. Find the area of the remainder in acres, poles, and yards.

3. Simplify

$$\frac{\cdot175 - \cdot116 \text{ of } \frac{1\frac{3}{4}}{3\frac{1}{2}}}{\cdot083 \text{ of } \frac{1\frac{5}{7}}{2\frac{6}{7}} + \cdot55}.$$

How will the value of this fraction be altered, if in each of the decimals in the numerator, the decimal point be moved one place forward?

4 Tea at 4s. 3¼d. per ℔ is mixed with tea at 3s. 7¼d. per ℔. so that the mixture contains 72 per cent. of the former Find the weight of a chest of this mixture which is worth £6 16s. 10d.

5 A debt of £700 is discharged by a payment of £180 in cash. and a bill for £533 due 6 months hence. At what rate is discount calculated ?

6 A person buys 5 shares in a company, and sells three of them at a gain of 10 per cent., and the remaining two at a gain of 16¾ per cent. The gain on the latter sale is £2. 19s. 7¼d. more than on the former. Find the price of a single share.

7. Water flowing at the rate of 6 ft. per second through a pipe. the area of whose section is 1 sq. ft., wile fill a certain tank in 2 hrs. The tank is empty at the beginning of the Monsoon, and receives all the rain that falls on an area of an acre. Find the depth of rain in inches which must fall in order to fill the tank.

8. When the East India 4 per cent. stock is at 12 discount, and the 5 per cent. ditto at 5¾ premium ; find the difference in the rates of interest obtained by investing in these stocks respectively.

A person has a certain sum to invest, and finds that the latter stock will give him an annual income of £3. 7s. 6d. more than the former ; what is the sum ?

9. Two clocks, of which one gains and the other loses one minute in an hour, strike one o'clock together, show that the interval between their respective striking 2 will be $2\frac{4}{3599}$ minutes by a correct clock.

III.—(1868).

Express $\frac{3}{4}$ of Rs. 17-8+$\frac{5}{8}$ of £1-14-6 as a decimal of Rs. 170, a rupee being worth 2 shillings.

Explain how the magnitudes of fractions may be compared by reducing them to others having a common *denominator*. Reduce $\frac{5}{8}$, $\frac{5}{12}$, $\frac{7}{16}$, $\frac{13}{27}$ to a common denominator, and write them down in order of magnitude.

State the rule for the reduction of recurring decimals to fractions and reduce ·17 to a vulgar fraction.

The weight of a cubic foot of water is 62·321 lbs. What then will be the capacity in cubic inches of an Imperial gallon, which holds exactly 10 lbs. weight of water?

At what rate per cent., simple interest, will £7,433-6-8 amount to £9, 942-1-8 in 7½ years?

Find the square root of $\frac{7}{11}$, and the cube root of $\frac{9}{11}$ each to 3 places of decimals.

A room 35 feet long by 18 feet broad is enclosed by walls 18 inches thick, and all round the outside there is a verandah 9 feet deep. What will be the cost of paving this verandah at the rate of 8 annas per square yard?

A merchant buys some cloth at such a price that by selling it at Rs. 4-6-0 per yard he will gain 5 per cent. on his outlay. What percentage will he gain or lose if the cloth be sold at Rs. 3-14-0 per yard?

In sending 1000 cheroots to England I paid freight $\frac{2}{3}$rds of their prime cost; landing charges $\frac{1}{3}$rd of their cost, including freight; and duty 2½ times their cost including freight and landing charges. Altogether the cheroots, duty paid, in London cost me £7. What did I give for them at Madras?

IV.—(1869).

A Railway cutting is 38 feet wide at the bottom, and 74 feet at the top, 35 feet deep, and $\frac{3}{4}$ths of a mile long. How many cubic yards of earth were removed?

2. Simplify the expression

$$\frac{\frac{1}{4} + \frac{1}{4} + \frac{1}{7}}{\frac{1}{2} + \frac{1}{4} + \frac{1}{6}} - \frac{6}{11} + \frac{2}{35}.$$

3. A number of rupees is divided amongst four people. A receives $\frac{2}{3}$rds of the whole, B $\frac{3}{4}$ths of the remainder, C $\frac{4}{5}$ths of what then remains, and the number of rupees given to D is the square root of the whole number to be distributed. What sum does each receive?

4. Express .01056 and ·15863 as vulgar fractions in their lowest terms, and the quotient of ·010989 divided by ·076923 as a recurring decimal.

5. At 10 minutes to two in the afternoon a clock is 55 seconds slow, and at six in the evening it is 60 seconds slow; at what hour will it show true time?

6. A person sells out of the 3 per cents. at 96 and invests his money in Railway 5 per cent. stock at par; find how much per-cent. his income is increased.

7. At an examination $\frac{1}{5}$th of a class gains $\frac{7}{8}$ths of the maximum number of marks, $\frac{1}{10}$th gains $\frac{3}{4}$ths, $\frac{2}{5}$ths gain $\frac{1}{2}$, $\frac{1}{5}$th gains $\frac{1}{3}$, and the rest $\frac{1}{4}$. The average number of marks gained by the whole class is 166; what is the maximum?

8. If a pound weight of standard gold is worth £61-18-9, find the least integral number of pounds of gold that can be coined into an integral number of sovereigns.

9. For $\frac{2}{3}$rds of the distance up a ghaut the rise is 1 foot in 24 (measured along the road) and for the remaining third the rise is 1 in 16. The top of the ghaut is 1,400 feet above the bottom; what is its length?

10. Find the length of an edge of a cube of pure gold equal in value to the annual revenue of Great Britain (70 millions sterling), given that gold is 19·26 times as heavy as water, that a cubic foot of water weighs 1,000 oz, and that the value of fine gold is £4-5 per oz.

V.—(1872-73).

1. Find the square root of 67881121 and the cube root of 1064332261.

2. What would be the cost of carpeting a room 21ft. 9in. long by 20ft. 4in. broad with carpet 3ft. wide at 3s. 4½d. per yard?

3. A clock in which the hour-hand has been displaced shows the time to be 16′ minutes past 3, and the two hands are together: the time is between 3 and 4 o'clock. Find by how many minute divisions the hour-hand has been displaced.

4 Reduce Rs. 3-4-8 to the decimal of Rs. ·7, and divide £48-8-7 by ·059.

5 A man buys 100lbs. of tea at 5s. per lb, and, 40lbs. at 3s. 6d. per lb; he mixes them, and' sells the mixture at a loss of 12½ per cent. at how much per lb. does he sell the tea?

6 An American dollar is equal to Rs. 2-2⅔ As. and is also equal to 5·375 Francs, how many Francs are there in one Rupee?

7 A man borrows Rs. 355-11-8; and at the end of 18 months has to pay Rs. 419-12-2; what is the rate of interest per mensem?

8 In a company of 100 people, of whom some are rich and some poor, the rich subscribe and give 1an. 3p. to each poor man; this costs the rich men 7as. 1p. each; how many rich and how many poor men are there?

9. Divide £100 among A, B, C, D, so that A's share may equal twice B's share; A's share and B's share together may equal twice C's share, and A's share and C's share may be together double D's share.

10 A bequeathes to B a certain sum of money, which after paying a legacy duty of 10 per cent. yields an income of £810 when placed at interest 3 per cent. Find the amount bequeathed.

11. A down-train usually travels at the rate of 30 miles an hour and meets an up-train 50 miles from the terminus. On one occasion, on account of an accident, it only went at the rate of 20 miles an hour and met the up-train 41⅔ miles from the terminus. Find the speed of the up-train.

VI.—(1873).

1 Find the value of

·14375 of a £ — ·2916 of 1s. 6d. + ·5625 of a shilling.

2. If a man charges 11s. 10d. for carrying 2qrs. 15lbs. a distance of 8miles, how much should he charge for carrying 1cwt. 1qr. 9lbs. a distance of 17 miles ?

3. If 1000 rupees a month is equivalent to £1112-10 a year, what is the value of a rupee in English money?

4. In what proportion must tea at 2s. 5d. per lb be mixed with tea at 3s. 5d. per lb ithat the mixture may be worth 3s. per lb. ?

5. If 1 rupee = 1s. 10¼d. 1 sovereign = 4·84 dollars, and 1 dollar = 5·2 francs, find the value in francs of 10 lacs of rupees.

6. A man who can walk down a ghaut at the rate of 4½ and up it at the rate of 3¼ miles an hour, descends and returns to his starting point after walking for 2 hours and 4 minutes. How far did he walk ?

7. If 25000 square links = 10 square poles and a sq. pole = 30¼ sq. yd., find the length of a link in inches and decimals of an inch.

8. An express train owing to a defect in the engine goes at ⅝ths of its proper speed, and arrives at 6·49 P. M., instead of 5·55 P. M. At what hour did it start ?

9. Express the sum of the series

$$\frac{1}{3\cdot5} + \frac{2}{3^2\,5^3} + \frac{2}{3^3\,5^5} + \frac{4}{3^4\,5^7} + \&c.,\text{ to infinity as a deci-}$$

mal, true to six places.

10. Given that gold is worth £3. 17s. 10d. per oz., and silver 4s. 10d. per oz., and that the weights of equal volumes of gold and silver are as 19 : 11; find the length (in inches to 3 places of decimals) of an edge of a cube of silver equal in value to a cubic inch of gold.

VII.—(1874).

1. If 1 cwt. 3 qrs. 7 lbs. of an article cost £4 13s. 0½d., at what price per lb. must it be sold so as to gain 1-11th of the outlay ?

2. 13 lbs. of tea at 3s. 6d. a lb. are mixed with 19lbs. at 3s, 11d. a lb.; what is the price of the mixture in rupees, annas and pice when a rupee is equivalent to 1s. 11d. ?

3. Reduce 7 oz. to the decimal of a ton. To how many places must the decimal of a ton be carried that it may be true within an oz. ?

4. A and B own a ship in shares which are in the ratio of 2 to 3. They dispose of parts of their shares to C, so that A, B and C hold the ship in equal shares. What is the ratio of the payments that C must make to A and B ?

5. The cost of carpeting a room whose length is 22 ft. 8 in. with carpet at 3s. 4½d. a square yard is, £7. 7s. 4d. ; find the breadth of the room.

6. Find the diagonal of a square whose side is one-fifth of a mile.

N.B.—The result is to be found as the decimal of a mile and is to be true within an inch.

7 A landowner pays his agent 5 per cent. on the gross rental of his estate, and after paying an income tax of 9d. in the £ on the remainder, has £2,456-12-5 left. What was the gross rental ?

8. Find the value of the following series as a decimal true to six places —

$$\frac{1}{7} + \frac{1}{3} \cdot \frac{1}{7^3} + \frac{1}{5} \cdot \frac{1}{7^5} + \&c., \text{ to infinity.}$$

9 A tradesman selling goods for a certain price to be paid six months hence offers to give one-tenth more of the same good for the same price ready money. What was the rate of discount ?

10. A person buys saddlery in London for £31, and pays £3. 5s. for freight and insurance to Madras. On the arrival of the goods he pays 7 per cent. duty on the declared value which was the London price turned into Rupees at the current rate of exchange. If he had bought them in Madras he would have paid 40 per cent. above the declared value. How much did he gain by buying the goods in London, the rate of exchange being Rs. 10, as. 13, for a sovereign ?

VIII.—(1875).

1 If the value of the rupee varies from 1s. 9d. to 1s. 9½d. and the franc from 9½d. to 10d.; find the maximum number of francs which it is always safe to give for Rs. 500.

5

2. State and prove the rule for reducing a recurring decimal to a vulgar fraction.   If one cubic foot of water weighs 62·37lbs. Avoir: reduce the weight of

$$\frac{34\cdot45 \times 3\cdot44\dot{5} - 1\cdot55\dot{4} \times 1\cdot55\dot{4}}{\cdot4\dot{1} \times \cdot40\dot{5}} \text{ cubic feet}$$

to the decimal of a ton.

3. If the volume of a sphere $= \frac{4}{3} \times 3\cdot1416 \times$ the cube of the radius, find how many spherical balls each $\frac{1}{2}$ inch in diameter can be made out of a cubic inch of clay, and how much clay will remain?

4. Find the simple interest upon £365-10-6 in 3 years and 44 weeks at 6½ per cent. reckoning 52 weeks in the year.

5. Calculate the amount of an annuity of £100 per annum in 2¼ years at 5 per cent. compound interest, the annuity and interest being paid half yearly.

6. If the true discount on Rs. 1,000 at 3¼ per cent. simple interest be Rs. 166-10-8 when is the sum due?

7. The hands of a clock which gains uniformly at the rate of 15' a day were set at sunset on the evening of the first of the month at six o'clock.   The true time of sunrise on the 3rd was known to be a quarter to six but the clock indicated a quarter past six.   Find the error made in setting the clock on the 1st.

8. How much per cent. must be added to the cost price of goods that a profit of 20 per cent. may be made after throwing off a discount of 10 per cent. from the labelled price?

9. What must be the price of a £50 railway share which pays a dividend of 2¼ per cent. if the purchaser is to make 4 per cent. upon his outlay?

10. A gentleman receives 10 per cent. upon an investment in India. When the exchange is at 1s. 10½d. he disposes of his investment at a premium of 60 per cent. and transfers his capital to 6 per cent. English securities at par, which yield him an annual income of £1,770. Find his original income in India per mensem.

IX.—(1877).

1. In an examination A obtains 10 per cent. less than the minimum number of marks, required for passing, B obtains 11½ per cent. less than A, and C 41$\frac{7}{17}$ per cent. less than the number of marks obtained by A and B together. Does C pass or fail?

2. If the cost of making bread be one rupee per bushel of wheat, what is the price of wheat when the two-anna loaf is twice as large as it is when wheat is Rs. 5 a bushel?

3. If the rupee is worth 1s. 9d. and the mohur 30s. find the least number of pounds which can be paid exactly in rupees or mohurs.

4. If the rate of wages vary as the price of rice, and if 57 men working for 35 days receive Rs. 405-3-9 when rice is sold at the rate of 136 measures for Rs. 39; find the price of rice per measure when 70 men working for 19 days receive Rs. 353-4-6.

5. A certain number of men and women subscribe a sum of money, the number of women being four times the number of men. Each man subscribes as many annas as there are men altogether, and each woman as many pice as there are women altogether. The total amount subscribed being Rs. 756. Find the number of men and women.

6. Find the cost of surrounding a rectangular plot of ground 56½ feet long by 30½ feet broad with a paved walk 4 feet 3 inches wide at 2s. 8d. per square foot.

7. Paper-money is at a discount of 10 per cent. A man buys goods marked £27 (paper-money) and offers that sum in gold. How much paper-money must he receive in change, 10 per cent. abatement being allowed for cash?

8. A and B engage in trade, their capital being as 3 : 2. At the end of 3 months A takes out a sum equivalent to one-third of B's capital, and at the end of another 3 months B puts in a sum equivalent to what A took out. If A's profits at the end of the year are £110 more than B's, find the amount of the profits of each.

9. What sum of money put out at compound interest will in 2 years amount to £1944·81, interest being at the rate of 10 per cent. per annum, and being paid *half-yearly*?

10. A person puts £1197 out at 30 per cent. per annum, interest, and spends at the end of each year £300 *more* than the annual interest on £1197, and thus at the end of a certain time has nothing left. If he had spent £300 *less* than the annual interest, how much would he have had at the end of the same time?

11. What sum must a person invest in the 3 per cents. at 90, in order that by selling out £1000 *stock* when they have risen to 93¼, and the remainder when they have fallen to 84¼, and investing the whole proceeds in the 4 per cents. at par he may increase his annual income by £9-5s.

·X.—(1878.)

1. Find by practice, the cost of 50 reams 14 quires 18 sheets of paper at Rs. 18 As. 12 per ream.

2. A clock loses 5 minutes a day. It shews correct time at noon on a Monday. After how many days will it again shew correct time on a Monday?

3. Prove that

$$\dot{0}7692\dot{3} = \frac{\cdot 07}{1 - \cdot 09} \qquad \frac{\cdot 0769}{1 - \cdot 0003} = \frac{\cdot 07692}{1 - \cdot 0004}$$

4. A field is 500 feet long and 30 feet broad, and a tank 30 feet long, 20 feet broad, and 12 feet deep is dug in the field, and the earth taken out of it is spread evenly over the field. how much is the level of the field raised?

5. Two persons rented some fields for £243 for 10 months. The one put in 27 oxen to graze for 8 months, and the other 270 sheep for 7 months. If 3 oxen eat as much as 11 sheep, how much of the rent ought each to pay?

6. There are two compound metals, the one consisting of a mixture of copper and gold, and the other of a mixture of copper and silver. The values of one ounce of gold, silver, and copper are £5, 5 shillings and 5 pence respectively. Find how much copper must be mixed with the first mixture, in order that the value of a given quantity of the first mixture may be 15 times the value of an equal weight of the second mixture, the latter mixture containing 80 per cent. of pure silver.

7   A well is fed by a spring which flows continuously and uniformly into it. When there are 10,000 cubic feet of water in the well, 7 men can empty it in 20 days; and when there are 15,000 cubic feet of water in the well, 5 men can empty it in 50 days. How many cubic feet of water flow into the well in one day ?

8. A merchant sells 49 quarters of wheat at a profit of 7 per cent., and a certain number of quarters at a profit of 11 per cent. The price of a quarter of wheat being £3-12-6, he would have lost £2-10-9 if he had sold the whole at a profit of 9 per cent. Find the total number of quarters of wheat sold by him.

9. If £31,250 put out at compound interest amount in 3 years to £43,904, what is the rate per cent. ?

10. If the true discount on a bill of £14,641 be £4,641 at 10 per cent. compound interest, how many years has the bill to run ?

11 A man has a certain amount of 5 per cent. stock. He sells out one-third of it at 104 and invests the proceeds in the 4 per cents. at 98. He sells out from the 4 per cents. when they have risen 2 per cent. and then repurchases, the same amount of 5 per cent. stock at 102 as he sold out originally. His gain being £202, find the amount of 5 per cent. stock originally held by him.

MATRICULATION EXAMINATION PAPERS.

———◆◇◆———

ARITHMETIC.

I.—(1862).

1. What is the fundamental principle in our system of arithmetic? Write the number three millions four hundred and fifty-two thousand one hundred and sixty-seven in an algebraical form, using x to denote ten.

   How would the Romans have written the numbers which are expressed in our notation 1918, 1231, 1262, 1862?

2. Divide 31 by ·124869 and ·124869 by 31. Give the *reason* of the rule for placing the decimal point in the quotient.

3. The Hindoo year consists of 365 days 6 hours 12½ minutes, the Mahommedan of 354 days 8 hours 48 minutes. After what length of time would the accumulated difference between them amount to the tropical year of 365 days 5 hours 48 minutes 49·7 seconds?

4. A bag contains a certain number of rupees, half as many again two-anna pieces, and four times as many pice; and the value of the whole is Rs. 300: find how many rupees, how many two-anna pieces and how many pice are there? (4 pice = 1 anna.)

5. How many times does $(\frac{3}{4} + \frac{3}{4} - \frac{1}{15})$ contain $(\frac{3}{7} + \frac{1}{3} - \frac{1}{12})$?

6. What decimal of 1 bushel 1 pint, are $\frac{3}{4}$rds. of 3 gallons 2 pints?

7. Divide accurately ·0324 by ·36 and extract the square root of the quotient to four figures.

8. A creditor receives upon a debt of Rs. 3,270 a dividend of 9 annas 2 pies in the rupee, and afterwards he receives a further dividend upon the deficiency of 3 annas 4 pies in the rupee; how much does he receive in the whole?

9. Find the present value of two sums of Rs. 100 payable at the end of one year and two years respectively, money making 7½ per cent. per annum.

10. If mangoes be bought at the rate of seven for an anna; how must they be sold to gain 33 per cent.?

11. Four French feet are equal to 1·3 metres, and 15 French feet are equal to 16 English feet; how many metres are 27 English feet equivalent to?

II.—(1863).

1. Explain the principle of the Decimal System of Numeration. Write down in words the number 4010010. What number expressed in the Decimal System, is identical with the number 4321, in which the base of the system of numeration is 12?

2. Divide Rs. 6,148-5-4 by 136.

3. A barters some sugar with B for flour, which is worth 2s. 3d. per stone, but uses a false stone-weight of 13¼ lbs.; what value should B set upon his flour, that the exchange may be fair?

4. An annual tax of Rs. 2,255 is laid upon a district containing four villages—A, B, C, D,—and the rate to be paid by each of the villages A, B, and C, is to the rate to be paid by D, as 3 to 2: what are the annual payments due from the villages?

5. Explain the following terms,—an improper fraction, a compound fraction, a mixed number. Add together ⅓ of ¾ of a year, ⅘ of ⅚ of a day, and ⅐ of ⅔ of 19½ hours.

6. Divide ·00333822 by ·1357. Reduce 18s. 9¾d. to the decimal of one pound.

7. The area of the entire surface of a pond is 9 acres 2 roods 15 poles; find to 3 places of decimals, the number of yards in the side of a square piece of ground of equal area.

8. A man sells a horse for Rs. 246 and loses 26½ per cent. on what the horse cost him; what was the original cost?

9. Explain the difference between *interest* and *discount*; and find the discount on £397 6s. 8d. due 9 months hence, at 4 per cent. per annum.

10. If the carriage of 150 feet of wood, that weighs 3 stone per foot, cost Rs. 30 for 40 miles, how much will the carriage of 54 feet of stone, that weighs 8 stone per foot, cost for 25 miles?

III.—(1864).

1. Express in figures the following distances in miles of some of the planets from the Sun :—

> Thirty-seven millions (for Mercury.)
> Sixty-nine millions (for Venus.)

Four hundred and ninety-four millions (for Jupiter.)

Write down in words the numbers signified by the following figures :—

> 900300804, 60660608008.

2. Find the greatest common measure of the numbers 12129 and 30081. Investigate whether the numbers 3714 and 1815 have a common measure or not.

3. Express in the scale of 8 the number seven hundred and eighty-four millions three thousand and forty-two.

4. To the sum, difference, and product of ½ and $\frac{3}{11}$ find a fourth proportional.

5. Find the sum, difference, product, and ratio of the decimal numbers, 4075·32, and 186·4215. Demonstrate the rule for pointing the quotient in the division of decimal fractions.

6. The proportions used in making English gunpowder are, saltpetre 75 parts, sulpher 10 parts, and charcoal 15 parts. How many pounds weight of each material are there in 10 cwt. of gunpowder?

7. Extract the square root of 115·297356.

8. A, B, and C form a joint stock of Rs. 7,50,000, of which Rs 36,000 are contributed by A, Rs. 30,000 by B, and the remainder by C. At the end of the year, the profit is found to be Rs. 16,791. Required the shares of this which each is to receive. Rs. 800 a month being allowed as salary to C as acting partner.

9. Calculate the interest on 4 lacs of rupees from the 23rd November 1864 to the 25th May 1865 at 8 per cent. per annum.

10. If 12 iron bars, each 4 feet long, 3 inches broad, and 2 inches thick, weigh 576 lbs., how much will 11 weigh, each 6 feet long, 4 inches broad, and 3 inches thick.

IV.—(1865.)

1. Point and write in words, both according to the English and Indian numerations, the two numbers :—

    1234567654321.

    5020040003060.

2. Subtract Rs. 45,867-12-6 from Rs. 86,325-8-3. How are the numbers placed in subtraction?

3. If a room is 28 feet long, 20 feet wide, 13 feet high, and the windows and doors take up half the walls, find the cost of papering at 12 annas a square yard.

4. How many square feet are there in 578 pieces of Grey Domestics 39 inches wide, and 72 yards long? and what is the price at Rs. 20-14 annas per piece?

5. Multiply $\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+\frac{1}{6}$ by $1\frac{1}{2}\times1\frac{1}{3}\times1\frac{1}{4}\times1\frac{1}{5}\times1\frac{1}{6}$.

6. Reduce $\frac{1}{30}$, $\frac{1}{31}$, $\frac{1}{32}$ to decimals.

7. If I sell Rs. 500, 4 per cents. at 93, and buy $5\frac{1}{2}$ per cents. at 109, what is the change in my income?

8. Divide a lakh of rupees between A, B and C, in the proportion of 2, 3, 4, and the same amount between D, E, and F in the proportion of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$.

9. If I sell 40 shares of Rs. 250 each in the Oriental Bank at 121 per cent. premium, how many shares of Rs. 1,000 each in the Madras Bank at 72 per cent. premium can I buy? and how much will be left?

10. A person travelled 120 miles by railway at 15 miles an hour, 120 by road at 8 miles an hour and 60 by bullock cart at 2 miles an hour: how long did he take?

11. Find the square root of 173388·96 and the cube root of 1860·867.

V.—(1866).

1. Represent in figures:—

   Ninety-nine millions, ninety-nine thousand and ninety-nine

   And by the old English method of numeration, eight billions, two hundred and seven thousand and five.

   Point and write out in words 319680209078 and 20090060002.

   The first according to the Indian method, and the second according to the English method of Numeration.

2. Add together $\frac{4}{5}$ of $\frac{5}{6}$ and $\frac{7}{8} + 1\frac{1}{2} - \frac{15}{16}$, and explain why fractions must be reduced to a common denominator for the purpose of Addition and Subtraction.

   (a) What fraction must $\frac{5}{8}$ be divided by to give a quotient $1\frac{1}{2}$?

3. A person who has $\frac{3}{4}$ of a mine sells $\frac{1}{4}$ of his share for Rs. 1,500, what is the value of his share and of the whole mine?

4. Explain why in reducing a fraction to a terminating decimal, the number of decimal places depends on the form of the denominator of the fraction and not on that of the numerator.

5. Reduce 1 cwt. 3 qrs. 5 lbs. to the decimal of $\frac{2}{3}$ of a ton.

6. Perform the operations indicated below:—

   (i) 47·03—2·876843.

   (ii) 5·776×2·003.

   (iii) 62·5÷125·125.

   (iv) 6·25÷·000125.

   (v) $\sqrt{2119\ 68161}$.

7. Define the terms :—

Stocks, shares, consols, state some of the circumstances which affect their value in the market.

How much stock can be purchased by the transfer of Rs. 20,00,000 from 4 per cent. at 90, to the 5½ per cents. at 110; and what change would be effected in the income derived from the two investments?

8. Find by practice the price of 549 yards at 18s. 9½d. a yard.

9. I bought cloth at 15 annas a yard, and lost 5 per cent. in selling; what was it sold for?

10. If a person owe Rs. 100 payable in 2 months, and Rs. 750 payable in 7 months, what is the just time for the payment of the two debts?

VI.—(1867).

1 Give a demonstrative example, illustrative of the following axiom :—

If the divisor be increased a certain number of times, the quotient is diminished in the same degree; but if the divisor be diminished the quotient is increased.

2. Define *prime* and *composite* numbers. Resolve 54180 into prime factors.

3. Reduce $\dfrac{26\frac{2}{3} - 1\frac{13}{11}}{\frac{4}{5} + \frac{2}{5} - \frac{1}{3}}$ to its simplest form.

4. Reduce $\frac{4}{9}$ to a circulating decimal; and find the fraction equivalent to 1·7016.

5. Find the product by contracted multiplication of 72·49 and 10·87632 to three places of decimals.

6. If $\frac{3}{4}$ of a maund of sugar cost 10 Rs. what will $\frac{1}{2}$ of a seer cost, at the same rate? Give answer in annas as well as in Rupees.

7. Explain *direct* and *inverse* proportions.

8. 250 men are employed to work on a Railway Embankment, a mile and a half long, which they are expected to finish in four weeks. But at the end of one week it is found that they have only finished 520 yards. How many more men must be engaged to finish it in the required time?

9. What time must elapse between the time of placing Rs. 250 in the Government Savings' Bank, and taking out the amount just as it goes over Rs. 300 supposing interest at 5 per cent. per annum, compound interest?

10. In a school of 250 children, 44 per cent. are learning Geography, 36 per cent. are learning Grammar, 12 per cent. cannot read, and .4 per 'cent. have advanced as far as Algebra. What are the actual numbers of each?

11. Extract the square roots of 6085, ·00025, and $\dfrac{7 \cdot 28}{52 \cdot 4}$.

12. What is the cost of a marble slate, 6 feet 3 inches long, 2 feet 8 inches broad, and 4 inches thick at 7 Rs. 8 annas per cubic foot?
    What is the weight of the slab, one cubic foot weighing 170 lbs.?

VII.—(1869).

1 Find the G. C. M. of 2231 and 4656; and the L. C. M. of 4 9, 16, 28, 42.

2. Add together $\frac{3}{4}$, $\frac{7}{11}$, $\frac{1}{21}$, $\frac{11}{15}$, $\frac{7}{13}$.

3. Find the value of :—

$$\frac{1}{3\frac{1}{5}} \; - \; \frac{2\frac{1}{4}}{9} \; + \; \frac{3\frac{1}{2}}{2} \; + \; \frac{\frac{1}{2}}{4\frac{1}{7}} \; .$$

4 Convert into vulgar fractions the decimals of ·015625 and ·01190476 and reduce the results to their lowest terms.

5. Reduce Rs. 6 as. 7$\frac{1}{2}$ to the decimal of Rs. 10

6. Divide the sum of Rs. 3281 as. 12$\frac{1}{2}$ among 4 persons in the proportion of 3, 5, 8, 9.

7. If £442 amount to £530 8s. in 5 years what is the rate per cent. of simple interest?

8   Find the amount of £1,000 in 6 years, at 5 per cent. compound interest.

9   If 27 men take 15 days to mow 225 acres of grass, how long will 33 take to mow 165 acres ?

10. A person has 100,000 stock in government 4 per cents ; he sells out all his stock at 92¼, he then reinvests the purchase money in Bank of Bombay Shares of Rs. 500 each, which pay 6 per cent. per annum, paying Rs. 625 for each Rs. 500 share ; find the alteration in his income.

11. Find the square roots of 3129361 and 434.027.

12. Show that the cube root of ·037 is ·3

VIII.—(1870-71.)

1   Write down in figures the following :—

Six hundred and fifty-four thousand three hundred and twenty-three billions, four thousand and twenty-one millions, fifty thousand, three hundred and one.

Express in words the number 1327875430029 according to the English, and Continental systems of numeration.

2   Find the value of $3\frac{3}{4}+4\frac{1}{2}+1\frac{1}{10}+3\frac{13}{20}$ both by vulgar fractions and decimals, and show that the two results coincide.

3.   Divide the difference of $7\frac{1}{2}$ and $9\frac{3}{5}$ by their sum, and multiply the quotient by $\frac{3}{8}$ of $7\frac{1}{4}$.

4.   If an ounce of gold be worth £4·0099 ; what is the value of a bar of gold weighing 1·683 lbs. ?

5.   If a family of 9 persons spend Rs. 4,800 in 8 months, how much will serve a family (living upon the same scale) of 24 persons for 16 months?

6   Three equal glasses are filled with a mixture of spirit and water ; the proportion of spirit to water in each glass is as follows : in the first glass as 2 : 3, in the second glass as 3 : 4, and in the third as 4 : 5· The contents of the three glasses are emptied into a single vessel ; what is the proportion of spirit and water in it ?

7   What are the weights of a sovereign and a shilling, the pound
    Troy of standard gold being coined into £46-14-6,, and the
    pound of silver into 66 shillings?

8. Find the interest on £215-12-0 for 3 years, 8 months and 10
    days at $4\frac{1}{2}$ per cent per annum.

9. A ship worth Rs. 9,000 being entirely lost, of which one-
    eighth belonged to A, one-fourth to B, and the remainder
    to C; what loss will each sustain, supposing Rs. 5,400 of
    the ship were insured?

10. Extract the square roots to 6 places of decimals of ·099 and
    of 3 3.

11. How much stock in the 3 per cents must I sell to pay off
    a debt of £550, the price of the stock being $94\frac{1}{2}$, and the
    commission of $\frac{1}{8}$ on £100 of stock being also taken into
    consideration?

IX.—(1871-72).

1. The distance of the sun from the earth is ninety-one millions
    seven hundred and seventy-six thousand miles, and light
    travels from the former to the latter in seven minutes
    and fifty-eight seconds; find the velocity of light per
    second.

2   Find the G. C. M. of 441441 and 844272 : and the L. C. M.
    of 7, 11, 21, 63, 91, 99, 117, 143.

3. Define a fraction, and prove that the value of a fraction is
    not altered if we multiply both its numerator and deno-
    minator by the same whole number.

    Bring $\left(\dfrac{5\frac{1}{4} - \frac{1}{3} \text{ of } 2\frac{1}{3}}{\frac{2}{3} \times 4\frac{1}{2} + \frac{1}{15}} \neg \dfrac{2\frac{3}{4}}{4\frac{3}{7}} \right) \div \quad \times 3\frac{19}{256}$ cwt.

    to the fraction of $4\frac{1}{2}$ ton.

4. State and prove the rules for reducing, terminating, and cir-
    culating decimals into their equivalent vulgar fractions.

    Ex. ·03125 and ·729

Find the value of

0·3125 of Rs. 2 + ·729 of Rs. 3½ + ·729 of Rs. 2⅝

5. If 10 horses and 98 sheep can be kept 9 days for £37. 17s. 6d.; what sum will keep 45 horses and 216 sheep for 40 days supposing 5 horses to eat as much as 76 sheep?

6. If the par of exchange be two English shillings for the Indian rupee, but if an Indian bill of exchange for Rs. 540 as. 12 be negotiated in London for £51-10s.; how much per cent. below par is the rate of exchange?

7. Distinguish between interest and discount. The interest on a certain sum of money for three years is Rs. 825, and the discount for the same time is Rs. 645, simple interest being reckoned in both cases. Find the rate per cent. per annum, and the sum.

8. A person desires to paper his room with postage stamps: the room is 14 feet 9 inches long, 9 feet 3 inches broad, and 10 feet 6 inches high; it contains two windows, each 5½ feet by 4 feet, and 3 doors each 6 feet by 3 feet; a postage stamp is 1⅝ inch long and ¾ inch broad. Find the number of postage stamps required to cover the room.

9. A person invests 1,250 gold mohurs in the Government five per cent. rupee stock at 105. The stock is converted subsequently to 4½ per cents. at 95. Find the difference in his income, each gold mohur being considered equivalent to Rs. 17.

10. A certain number of persons agree to subscribe as many pies each as there are subscribers: the whole subscription being Rs. 5,797 14 annas 4 pies. How many subscribers were there?

X.—(1873-74).

1. Simplify :—

$$\cfrac{\cfrac{816}{166463} - \cfrac{1}{1393}}{1 + \cfrac{1}{1393} \times \cfrac{816}{166463}}$$

2. Find the value of

    $\cdot$375 of a guinea $+$ $\cdot$54 of 8*s*. 3*d*. $+$ $\cdot$027 of £2. 15*s*. and reduce the result to the fraction of a guinea and a half.

3. A man owns $\frac{7}{28}$ of a ship and sells $\cdot$3571428 of his share : what fraction of the ship does he still own ?

4. If the income tax be 6 pies in the rupee for the first half of the year and 3 per cent. in the second, what is the gross income of a gentleman whose net annual receipts amount to Rs. 1454 1anna ?

5. Five men do $\cdot$6006 of a piece of work in 2$\cdot$12 hours, how long will 6 boys take to finish it, it being known that 3 men and 7 boys have done the whole piece of work in 3 hours ?

6. If the difference between the simple and compound interest on a sum of money for two years at 5 per cent. be £5 18*s*. 9$\frac{1}{4}$*d*. ; find the sum.

7. When the three per cents. were at 90, I found that by selling out and investing in the four per cents. at 95 I could improve my income by Rs. 242. What was the amount of my stock in the three per cents. ?

8. A gardener plants an orchard with 5776 trees, and arrange them so that the number of rows of trees equals the number of trees in each row. How many rows were there ?

9. How many seconds will a train 184 feet in length, travelling at the rate of 21 miles an hour, take in passing another train 223 feet long, proceeding in the same direction at the rate of 16 miles an hour ?

10. Find the cube root of 1879080904.

XI.—(1874-75).

1. Simplify the fraction—

$$\frac{\frac{1}{3} + \frac{3}{11} + \frac{7}{24} - \frac{1}{3} \text{ of } \frac{3}{11} \text{ of } \frac{7}{24}}{1 - \frac{1}{3} \text{ of } \frac{3}{11} - \frac{3}{11} \text{ of } \frac{7}{24} - \frac{7}{24} \text{ of } \frac{1}{3}} .$$

2. Divide 8$\cdot$064 by $\left\{ \cdot846 + \frac{3}{5}\text{ of }\cdot2916 \right\}$.

3. A man owns $\frac{3}{10}$ of a house, and sells ·1351 of his share : what fraction of the house does he still own ?

4. In a subscription list one-half of the subscriptions are a guinea each, one-third a half guinea each, and the 5 shilling subscriptions which complete the list amount to £12 ; find the whole amount subscribed.

5. If the work done by a man, a woman, and a child be in the ratio of 3, 2, 1, and there be in a factory 24 men, 20 women, and 16 children, whose weekly wages amount to Rs. 204; what will be the yearly wages of 27 men, 40 women, and 15 children ?

6. The debts of a bankrupt amount to £2,134. 10s. 6d., and his assets consist of property worth £916. 15s. 4¼d., and an undiscounted bill of £513 due 4 months hence, simple interest being reckoned at 4 per cent. How much in the pound can he pay his creditors ?

7 A merchant buys 4,000 maunds of rice, one-fifth of which he sells at a gain of five per cent., one-fourth at a gain of ten per cent., one-half at a gain of twelve per cent. and the remainder at a gain of sixteen per cent. If he had sold the whole at a gain of eleven per cent. be would have made Rs. 728 more. What was the cost of the rice per maund ?

8. The shares in a banking concern are Rs. 200 each, Rs. 2,610¾ are only paid up, and the shares are quoted in the market at Rs. 460. The dividend is Rs. 7½ per share quarterly. A gentleman holds 100 original shares. Find what interest he makes per cent.; and what he would make, and how much per cent., if he sold out and invested in 4 per cent. Government stock at par.

9. A and B are the termini of a Railway 144 miles long. A fast train starts from B at 9h. 0 m.; another fast train, travelling at the same rate, starts from A at 10h..0m. A slow train starts from B at 10h. 20m.; the fast train from A meets the other fast train at 11h. .30m., and the slow train at 12h. 32m.; find the rates at which the trains travelled.

10. Arrange in order of magnitude :—

$$\sqrt{50,} \quad \sqrt[3]{344,} \quad \sqrt[4]{2402.}$$

XII.—(1875-76).

1. Write out in words the following expressions :—

   (a) 8271096.

   (b) 9032804.

   (c) 319080259417.

   (d) 8004640.

2. What is the rule for the addition of concrete numbers ?

   Add together 17 miles, 3 furlongs, 19 poles, 28 yards, 2 feet 10 inches; 4 miles, 3 furlongs, 8 poles, 7 yards, 2 feet and 9 inches

3. Explain what is meant by the following words and give examples :—

   Measure, Multiple, Greatest Common Measure, and *Least Common Multiple.*

4. How many acres are contained in three countries, of which the first comprises 723,100 square miles, the second 12,342, and the third 89,704 square miles ?

5. Divide $\frac{1}{2}$ of $\frac{3}{4}$ of $\frac{1}{7}$ of 42 by the sum of $2\frac{1}{2}$ and $4\frac{3}{5}$.

6. What are *continued fractions,* and when do you make use of them ?

   Find three fractions approximating to $\frac{131}{212}$

7. Find the product of 17·302 and ·579 to three places of decimals, by the rule of the Contracted Multiplication.

8. What sum will discharge a debt of Rs. 7,200 due a year and a half hence at 4 per cent. per annum ?

9. Find the square root of 745·29 and the cube root of 32768.

10. Divide a guinea between A, B, C, D, so that B's share is $\frac{1}{4}$ more than A's, C's $\frac{1}{3}$ more than B's and D's $\frac{1}{2}$ more than C's.

11. How much stock can be purchased by the transfer of Rs. 20,000 stock from the 3 per cent. at 90 to 3½ per cent. at 96 ; and what change will be effected in income by it ?

12. Required the number of square feet there are in a piece of slate $2\frac{1}{2}$ feet $\frac{1}{3}$ in., in length, and $1\frac{1}{3}$ feet $\frac{1}{2}$ in. width.

XIII.—(1877-78).

1. Define the arithmetical terms :—*notation, numeration, unit, integer, fraction, abstract, concrete.* Can you (1) multiply concrete numbers together? (2) divide a concrete number by a concrete number. Give examples to illustrate the nature of such operations.

2. Two men A and B start together, and when A has gone a mile

B has gone $\frac{8}{30}$ of $1\frac{2}{3}$ of $\frac{1\frac{1}{2}}{5\frac{2}{3}}$ of $\frac{\frac{2}{3}+\frac{1}{2}}{\frac{2}{3}-\frac{1}{3}}$ of $71\frac{2}{4}$ of

$$\frac{\dfrac{\frac{2}{3}}{1-\frac{2}{5}} + \frac{1}{3} + \frac{1}{4}}{1-\frac{1}{4} \text{ of } \left(\dfrac{\frac{2}{3}}{1-\frac{2}{5}}+\frac{1}{3}\right)}$$ of a mile; which is in advance of the other?

Express the difference between $\cdot378$ of $13s.\ 10\frac{1}{2}d.$ and $\cdot378$ of $16s.\ 6d.$ as a fraction of

$$\cdot 42\dot{6}\ \text{of}\ \frac{3\cdot3}{\cdot08}\ \text{of}\ \frac{\cdot3}{\cdot735}\ \text{of}\ \frac{\cdot147\times4\cdot4}{11\cdot1}\ \text{of £1. } 17s.\ 6d.$$

4. A lb. of tea and 3lbs. of sugar cost Rs. 3, but if sugar rose 50 per cent. and tea 10 per cent., they would cost Rs. 3-8 as., find the prices per lb. of tea and sugar.

5. The circumferences of the wheels of a carriage are $6\frac{3}{14}$ feet and $8\frac{1}{18}$ feet; what is the *least* distance in which both wheels will *simultaneously* complete an integral number of revolutions? How often will the lowest points of the two wheels at starting touch the ground together in 10 miles?

6. A, B and C rent a field for Rs. 2,878. A puts in 12 Horses for 5 months and 45 sheep for 3 months; B puts in 15 oxen for 6 months and 54 sheep for 2 months; C puts in 6 horses and 48 oxen for 3 months. Now, 4 horses and 3

sheep together eat as much as 5 oxen and 1 horse, and 2 oxen eat as much as 7 sheep ; how much of the rent should A, B, C, pay respectively?

7. What sum of money will amount to 699*l.* 13*s.* 2·4*d.* in 2 years reckoning compound interest for the first year at 4 per cent. and for the second 3½ per cent. per annum?

8. A person finds that if he invest a certain sum in railway shares paying £6 per share when the £100 share is at 132, he will obtain 10*l.* 16*s.* a year more for his money than if he invest in 3 per cent. consols at 93. What sum has he to invest?

9. Find the value of $\sqrt{\cdot 00139876} - \sqrt[3]{\cdot 000030664297}.$

10. A man near the sea-shore sees the flash of a gun fired from a vessel steaming directly towards him, and hears the report in 15″. He then walks towards the ship at the rate of 3 miles an hour, and sees a second flash 5 minutes after the first, and immediately stops ; the report follows in 10 5″. Find the rate of the ship, the velocity of sound being 1,200 feet per second.

XIV.—(1878-79).

1. Seven men find a lump of gold weighing 13lbs. 7½ oz. Troy. What will be each man's share, supposing gold to be worth £3. 17*s.* 10½*d.* per ounce?

2. Simplify :—

$$1\tfrac{1}{11} \quad \frac{1-\tfrac{7}{21}}{2-\tfrac{1}{3}} + \frac{1\tfrac{3}{4}}{3\tfrac{1}{2}} - \frac{5\tfrac{3}{4}}{6\tfrac{1}{4}} \text{ of } \left\{ \tfrac{1}{5} \cdot \frac{\tfrac{1}{2}-\tfrac{1}{3}}{4\tfrac{1}{4}-3\tfrac{3}{5}} \right\}.$$

3. Find the value of—

·387 of £3. 16*s.* 3*d.* +6½ of ½½ of 7*s.* 8½*d.*+ $\tfrac{7}{11}$ of 1*d.*

4. What is the length of the edge of a cubical cistern which contains as much as a rectangular one whose edges are 154ft. 11in., 70ft. 7in., and 53 ft. 1in.?

5. In 1861 three towns had populations of 17,650, 19,600, 18,760, respectively. In 1871 the population of the first had decreased 18 per cent., that of the second had increased 21 per cent., while the population of the third had increased by 4,690; find the change per cent. in the population of the third town.

6. A bankrupt has goods worth Rs. 9,750; and had they realised their full value, his creditors would have received 13 annas in the rupee; but ⅞ lbs. were sold at 17·5 per cent., and the remainder at 23·75 per cent., below their value. What sum did the goods fetch, and what dividend was paid?

7. What sum will amount to £1,591 13s. 2·16d. in 3 years at compound interest; the interest for the first, second and third years being 3, 2 and 1 per cent. respectively?

8. Find the true discount on £2,750 due two years hence at 4¼ per cent.

9. If 4 men earn as much in a day as 7 women, and one woman as much as 2 boys, and if 6 men, 10 women and 14 boys working together for 8 days earn £22, what will be the earnings of 8 men and 6 women working together for 10 days?

10. A person having a certain sum of money to invest, finds that an investment in a railway stock bearing five per cent. interest at 117½ will yield him £29 more annually than an investment in the 3 per cents. at 92¼. How much money has he to invest?

FIRST EXAMINATION IN ARTS.

ARITHMETIC.

I.—(1862).

1. A person making his will, gave to his son $\frac{13}{20}$ of his estate and the rest to his daughter; when these legacies came to be paid, the one turned out £ 1,200 more than the other; what did the testator die worth?

2. Reduce $\frac{19}{113}$ qrs.—$\frac{3}{35}$ lbs. — $\frac{7}{15}$ oz. + $\frac{394}{871}$ drs. to Troy weight ; 3cwt., 34lbs., 2oz. to the decimal of 1ton 11cwt.

3. A person having to pay Rs. 10,572 two years hence, invests in the 4 per cent. Transfer Loan to accumulate interest till the debt shall be paid, and also an equal sum the next year. Supposing the investment to be made when paper is at $86\frac{1}{4}$, and the price to remain the same, what sum must be invested on each occasion that these may be just sufficient to pay the debt at the given time?

4. Find the least number of ounces of pure silver worth Rs. 2. 14 a. $6\frac{4}{11}$ p. per oz. that, with the proper proportion of alloy can be coined into an exact number of rupees.

II.—(1864.)

1. What number, expressed in the decimal system, is identical with the number 7531, in which the base of the system of numeration is 11?

2. Reduce Rs. 3-12-6 to the fraction of 10 Rupees. How many planks of teak, 12 feet long and $7\frac{13}{14}$ inches broad, will be required to floor a room $7\frac{1}{2}$ yards long and 5 yards wide ; a space $7\frac{1}{2}$ feet long and 5 feet broad being left unplanked?

3. Two ships sail from the same port: one of them sails west, 50 miles; and the other sails north, 84 miles. Find the distance between them in miles to four places of decimals.

4. Four Ryots A, B, C, and D jointly hired a government grazing-ground. A turned 7 buffaloes into it for 13 days; B, 9 buffaloes for 14 days; C, 11 buffaloes for 25 days; and D, 15 buffaloes for 37 days. The whole rent-charge for the ground was 210 Rupees, what rent must be paid by A, B, C, and D, respectively?

III.—(1865.)

1. 356 and 34 are two numbers, the base of whose system of notation is 7; multiply them together in that system of notation, and transfer the product to the system of notation whose base is 10.

2. How many teak planks, 14 feet 6 inches long, and 9¼ inches broad, will be required to floor a room 70 feet long and 30 feet broad?

3. A Legacy of Rs. 3,205 was left to a boy of 13 years of age; to come into his possession at the age of 17. The money was invested at 5 per cent. per annum, compound interest; what sum will the boy receive?

4. A merchant shipped to Bombay from Liverpool 300 pieces of linen, each piece being 25¼ yards in length; it was sold by his Agent at 1 rupee 12 annas per yard; the prime cost of the linen was 2s. 7½d. per yard; the freight 3¼d. per piece; the Agent's commission 5 per cent.; what was the merchant's gain on the transaction?

IV.—(1866).

1. 123 and 234 are two numbers expressed in the scales of notation whose bases are 4 and 5 respectively. Express their sum in the scale of notation whose base is 8.

2. Add together the circulating decimals 0·2̇4̇ and 0·5̇3̇4̇, and subtract their sum from 1⅓.

3. A privateer running at the rate of 10 miles an hour discovers a ship 18 miles off making way at the rate of 8 miles an hour ; how many miles can the ship run before she will be overtaken ?

4. I buy goods for Rs. 600, and sell them directly for Rs. 680, giving three months' credit ; what is gained per cent. per annum ?

V.—(1870-71).

1. Explain the rule for proving the correctness of the result of the multiplication of two numbers by casting out the nines and apply it to verify the equation,—

$$3748 \times 6236 = 23372528.$$

Is this method a perfect test ?

2. Divide the difference between $2\frac{1}{4}$ and $\frac{2}{3}$ of $1\frac{3}{5}$ by the sum of $\frac{1}{2}$ of $3\frac{1}{3}$ and $1\frac{3}{4}$; and find the value of

$$\cfrac{1}{2 + \cfrac{1}{3 + \cfrac{1}{4 + \frac{1}{5}}}}$$ reducing the result to a decimal correct

to five places.

3. Extract the square root of 0.053, and the cube root of $5\frac{104}{105}$. each to four figures ; and find what decimal of a rupee is 15 annas $11\frac{3}{4}$ pies.

4. What is the dividend on Rs. 2045, 12as. 9 p., at $11\frac{1}{2}$p. in the rupee ?

5. A Calcutta merchant has to pay Rs. 10,512-8as. to his agent in Bombay. What must he give for a bank draft to that amount, exchange being at $100\frac{1}{4}$?

VI.—(1871-72).

1. Reduce to a simple fraction the ratio between the sum and difference of the expressions :—

$$\left(\tfrac{3}{2}+\tfrac{4}{3}\right)\times\left(\tfrac{2}{4}+\tfrac{1}{2}\right) \text{ and } \left(\tfrac{3}{2}-\tfrac{2}{3}\right)\times\left(\tfrac{2}{4}-\tfrac{1}{2}\right).$$

2. Simplify the expressions—

$$1+\cfrac{2}{3+\cfrac{1}{4+\cfrac{1}{5\frac{3}{4}}}} \qquad \frac{\sqrt{1+\tfrac{1}{4}}\;\div\;\sqrt{1-\tfrac{1}{4}}}{\sqrt{1+\tfrac{1}{4}}\;\times\;\sqrt{1-\tfrac{1}{4}}}$$

3. If a person receive $4\frac{1}{4}$ per cent. interest on his capital by investing it in 4 per cent. Government stock; what is the price of the stock, and how much can be purchased for Rs. 12,000 ?

4. A man bequeathes his property amounting to Rs. 49,166 in such a way that one-third of his wife's share, two-fifths of his eldest son's, three-eighths of his younger son's, and half of his daughter's shares are all equal. Find the shares of each.

VII.—(1873-74).

1. Arrange in order of magnitude the fractions $\frac{8}{83}$, $\frac{39}{101}$, and $\frac{47}{104}$, and express the difference of the first two as a fraction of the difference of the last two.

2. Divide 73·8 by ·0018 and multiply the quotient by $\frac{3}{15}$ of ·0009747.

3. Reduce Rs. 619·1 anna to the decimal of 2830 rupees.

4. Distinguish between Interest and Discount. If the interest on £ 253. 2s. 6d. at five per cent. be equal to the discount on £257. 6s. $10\frac{1}{4}d.$ for the same time at the same rate, when is the latter sum due ?

5. The 4 per cents. are at $98\frac{1}{2}$, the $4\frac{1}{2}$ per cents are at $103\frac{3}{4}$. A person has a sum of money to invest which will give him one thousand rupees more of the former stock than of the latter. Find the difference of income he could obtain by investing in the two stocks.

VIII.—(1874-75).

1. Express as the fraction of £ 10 the difference between $8\frac{2}{3}$ and $8 \times \frac{2}{3}$ and find the value of $\frac{3}{4}$ of a ton of sugar when $\frac{1}{16}$ of a ton is worth £6. 5s.

2. Reduce to their most simple from :—

   (a) $\dfrac{3\frac{1}{4} - 2\frac{1}{5}}{\frac{3}{4} \text{ of } (\frac{1}{5} + \frac{1}{7})} \div 15\frac{5}{8}$.

   (b) $\dfrac{1 + 5\frac{1}{5} (1 + 5\frac{1}{5})}{1 + 2\frac{1}{4} (1 + 2\frac{1}{4})}$.

3. A manufactory turns out 50 tons of iron goods weekly, using up for that purpose 51 tons of iron at £6 15s. per ton, 100 tons of coal at 11s. 6d. per ton, and £45 worth of other materials; rent, rates and taxes amount to £219 annually; wages and incidental expenses to £75 per week. At what price per cwt. must the iron be sold in order that the works may gain 8 per cent. per annum on a capital of £ 35,000?

4. A trapezoid, the parallel sides of which are as 3 : 4, is to be cut from a rectangular board 12 feet long, and 2 feet wide; find the lengths of the parallel sides, that the trapezoid may be one-third of the board.

IX.—(1875-76).

1. Divide $\dfrac{7 (1\frac{1}{2} \text{ of } \frac{3}{14})}{\frac{1}{6} \left(\frac{3}{3\frac{1}{2}} \text{ of } 7 \right)}$ by $\frac{9}{14}$: and find the value of

   $\frac{3}{4} \div 1\frac{1}{5} - \frac{4}{5} + 3\frac{1}{14}$.

2. Express the sum of ·625 of £1; ·07 of £2-10; 32·5 of 5 shillings, and 2·375 of 13s. 4d. as a fraction of £1,157-17-8.

3. Calculate the profit made by a bookseller, assuming that he pays 11s. 4d. for a 16 shilling book, receives 25 copies for 24, and deducts 10 per cent. for commission.

4. A can mow $2\frac{1}{2}$ acres of grass in $6\frac{3}{4}$ hours and B $2\frac{1}{4}$ acres in $5\frac{1}{4}$ hours; in what time will they together mow a field of 10 acres, and how many acres will each mow?

5. A person has 200 shares in a Railway Company for which he paid Rs. 1,000 per share. When the shares are paying 2 per cent. he sells them all at Rs. 460 per share, and invests the proceeds in Government 3 per cents. at 92. Find the alteration in his income.

ENTRANCE EXAMINATION PAPERS.

ARITHMETIC.

I.—(1873).

1. Write in figures one million, ten thousand and one. Subtract 397 from 1,163 and explain the process.

2. Shew that when any number is divided by nine the remainder is the same as when the sum of the digits is divided by nine.

3. State the rules for the multiplication and division of vulgar fractions. What is a complex fraction?

Simplify:—

(1) $\left\{ \frac{8}{17} + \frac{3}{4} \text{ of } 7\frac{1}{2} \right\} \div 1\frac{2}{3}$ (2) $\frac{\frac{3}{8}}{\frac{5}{6}} + \frac{\frac{7}{8}}{\frac{5}{8} + 7\frac{1}{2}}$

4. What is the value of ·3375 of an acre? Reduce £1-10-4 to the decimal of two guineas.

5. Find the square root of 998001 and that of 3·14159 to three places of decimals.

6. If five pumps each having a length of stroke of 3ft., working 15 hours a day for 5 days, empty the water out of a mine? how many pumps with a length of stroke of 2½ft., working 10 hours a day for 12 days, will be required to empty the same mine, the strokes of the former pumps being performed four times as fast as those of the latter.

II.—(1874).

1. How many revolutions will a cart wheel of 3 feet 6 inches diameter make in going a distance of 6 miles, the ratio of the diameter of a circle to its circumference being given as 1 : 3·14159 ?

3. The Revenue of a village containing 15,756 acres of culti- vated land is assessed at 13 annas an acre. What will the Local Rate of 6½ per cent. on the Land Revenue payable by the village amount to ?

4. A bania purchases 1526 maunds of grain at 36 seers for the rupee. He sells one-half at 26 seers the rupee, at what rate must he sell the remainder so as to clear 50 per cent. on the transaction.

5. Find the interest on 24,485 rupees, for 1 year and 131 days at 12 per cent. per annum.

III.—(1876).

1. If a pound of pure silver be worth 62 shillings, the shilling containing 222 parts of pure silver in 240; what will be. the value in shillings of a rupee weighing 180 grains, the rupee containing 979 parts of pure silver in 1,000.

2. (a) How much is ·0125 of a day.

  (b) Find the value of $3\frac{3}{4} + 4\frac{1}{5} + 1\frac{11}{16} + 3\frac{12}{676}$.
  Express the result both as a vulgar and a decimal fraction.

3. Divide ·10724 by ·003125 and extract the square root of the result to three places of decimal.

4. (a) What sum at simple interest will amount to Rs. 6,000 in 6 years at 4 per cent. per annum ?

  (b) How much Government paper in the 6 per cent. can be bought for Rs. 500 when the funds are at 94, and what dividend will be got on it yearly ?

IV.—(1878).

1. If 135 Rs. 4 As. be divided equally amongst 24 persons, what will each receive?

2. Define a vulgar fraction. By how much does the difference of $1\frac{1}{16}$ and $\frac{9}{13}$ fall short of the sum? Express the defect as a decimal of 7.

3. (a) Subtract $\cdot 0\dot{3}$ from $\cdot 0\dot{3}$ and divide the result by $\cdot 102$.

   (b) Shew that $\dfrac{1}{7+\frac{1}{16}} = \cdot 14159$ nearly.

4. A room whose height is 11 feet and length twice its breadth takes 143 yards of paper 2 feet wide for its 4 walls; how much carpet will it require?

5. At what rate (simple interest) will Rs 1,300 amount to 1,381 Rs 4 as. in 15 months?

6. Find the square root of $\cdot 1$ to three places of decimal. What number has 01 for its square root?

ENTRANCE EXAMINATION PAPERS.

ENGINEER CLASSES.

ARITHMETIC.

I.—(1870-71) & (1871-72).

1. How often is £2,579 0s. 0¼d. contained in £6,011,656. 5s. 8¼d. ?

2. Find the value of :—

   6441⅝ cwt. at £10. 14s. 10¾d. per cwt. and of 219 tons 3qrs. 12oz. at £4. 19s. 11½d. per ton.

3. Find the value of :—

   (1) $(3\frac{1}{4}$ of $4\frac{1}{2}) \div (2\frac{1}{2} - \frac{1}{3})$ of $(3\frac{1}{2} - \frac{1}{4})$.

   (2) $(\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{8} + \frac{1}{16}) \div (\frac{1}{3} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16})$.

   (3) $\dfrac{\cdot 375 \times 375 - \cdot 025 \times \cdot 025}{\cdot 375 - \cdot 025}$.

4. What will be the cost of painting a room 20 feet 3 inches long, 18 feet 6 inches broad, and 10 feet 4½ inches high, containing two windows, whose dimensions are 7½ feet by 4½ feet each, at the rate of 2s. 9d. per square yard ?

5. A and B can do a piece of work in 6 days, B and C in 7 days, and A, B and C can do it in 4 days. How long will A and C take to do it ?

6. If 3 men working 8 hours a day for 16 days can dig a trench 96 yards long, 18 wide and 12 deep ; in how many days

will 32 men working 12 hours a day, dig a trench 192 yards long, 27 wide and 18 deep?

7. If 10 oz. of sugar be worth ·5625s; what is the value of 2 816 tons?

8. Define Interest, Discount, and Present worth. Find the interest and discount on £500 for 19 months at 5½ per cent.

9. A person invests £2075 in the 3 per cents. at 83, and when the funds have risen 2 per cent. he transfers his capital to the 4 per cent. at 104; find the alteration in his income.

10. A race course is 1¾ miles round. Five men start to walk round. They walk at the rate of 3, 3¾, 4, 4½ and 5 miles per hour. How long will it be before they all meet again at the starting point?

II.—(1872-73.)

1. Eight bells commence to toll simultaneously. They toll at intervals of 1½, 2½, 3, 4½, 5, 6, 8 and 9 seconds. How often will they toll simultaneously in 24 hours?

2. Find the value of

$$\frac{\frac{2}{11} + \frac{1}{21} + \frac{8}{77} - \frac{1}{5}}{\frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6}} \text{ of } \frac{\frac{4}{1\frac{1}{7}} \text{ of } \frac{3}{1\frac{1}{9}} - \frac{4}{3\frac{1}{7}} \text{ of } \frac{2\frac{1}{2}}{1\frac{1}{4}}}{\frac{2}{200} \text{ of } \frac{1}{7} \text{ of } 3\frac{1}{3} + 2\frac{1}{15} \text{ of } 1\frac{1}{8} \text{ of } \frac{1}{10}}.$$

3. If the difference between the simple and compound interest on a sum of money for 2 years, at 5 per cent., be £5 18s. 9¾d.; what is the sum?

4. A grocer buys 2 cwt. of tea: the first cwt. he sells at 5 per cent. profit; and the second which costs £1 more, at 12 per cent. profit. The difference in retail price being 4d. per lb.; what is the cost price of each?

5. A banker in discounting a bill due in 3 months, at 4 per cent. charges 5s. 1¼d. more than the true discount, find the amount of the bill.

6. A can do a piece of work in 27 days, A and B can do it in 15 days, A works alone for 12 days, A and C together for 5 days, and B finishes it in 7 days; find in what time B and C together could do it.

III.—(1873-74).

1. Reduce 5 tons 13 cwt. 2 grs. 27lbs. to the decimal of a cwt., and find by decimals the cost of that amount at £2 18s. $7\frac{3}{4}d.$ per ton.

Find the value of the following expressions:—

(a) $\dfrac{\frac{1}{4} \text{ of } 2\frac{1}{2} \text{ of } 4\frac{1}{2} \; -2\frac{2}{3} \text{ of } 1\frac{1}{6} \text{ of } \frac{3}{10}}{\frac{1}{4} \text{ of } 3\frac{1}{2} \text{ of } 4\frac{4}{10} \; +4\frac{1}{2} \text{ of } 3\frac{1}{2} \text{ of } \frac{3}{11}}$ of $\dfrac{1 + \dfrac{2}{3+\frac{1}{4}}}{2 + \dfrac{3}{4+\frac{2}{3}}}$.

(b) $\dfrac{\cdot 9^5}{\cdot 007 \times \cdot 01^4} + \dfrac{2^8}{3 \times 9.99}$

3. Explain clearly the meaning of the following terms :—Interest, discount, present worth, and rate of exchange. What is the difference between the simple and compound interest on £954 for 3 years at 3¾ per cent., interest payable yearly?

4. A merchant owes £600. He gives a bill for £200 due 3 months hence, a second for £200 due 6 months hence, and pays the remainder of the debt in ready money. Supposing the rate of interest to be 4 per cent. per annum, what ought he to pay?

5. What amount of stock must be purchased in the English 3 per cents. at 91½ to produce the same yearly return as 3 lakhs of rupees (a rupee = 1s. 10¾d.) invested in the Government 4½ per cents., at 101¼?

6. If the rate of interest for money is 4½ per cent.; what should be the rate of exchange for bills payable at sight in England when the rate for those payable six months after sight is 1s. 11⅛d. per rupee? (Assume that letters require one month for transmission from India to England).

7   A merchant sells a mixture (in the ratio of 1 : 3) of two
    different kinds of teas, at Rs. 2-4-0 and gains 33½ per cent.
    on the original cost.   If he had mixed the teas in the ratio
    1 : 2 and sold the compound at Rs. 2-8-0 he would have
    gained 35½ per cent., in his selling price.   Find the prime
    cost of each of the two kinds.

IV.—(1874-75).

1.   Add 100⅝, 1¾, ⅓, 7⅞.

2.   Out of a debt of £360. 16s. 3d. only Rs 2,407-12-0 is paid·
     How much is this in the £, reckoning a rupee as two
     shillings ?

3.   If one pound of standard gold of 22 carats (i. e., parts
     in 24) fine be worth £4.14s. 6d., find the value of a gold
     mohur of weight 7dwt. 23. gr. of fineness (993 in 1000).

4.   £1000 of 3 per cent. stock at 72 is transferred to 4 per cents.
     at 90; find change of income.

5.   A can do a piece of work in 10 days, B in 9, C in 12.   All
     begin together : A leaves after 3⅖ days; B leaves 2⅖ days
     before the work is done.   How long did the work last?

6.   12lbs. of tea and 25lbs. of coffee together cost £4. 6s. 8d.,
     but if tea were to rise 2½ per cent. and coffee to fall 4½
     per cent. the same quantities would cost £4. 5s. 11d. Find
     prices of tea and coffee.

7.* What is the present worth of a lakh of rupees due two years
     hence at 5 per cent. per annum, compound interest ?

8.   By selling pens at a guinea a thousand, ⅔ of the cost price
     is realized. Find the cost price.

V.—(1875-76).

1.   Add one lakh ; 12 crores ; 1⅗, 2/1¼+1·13.

2.   Exchange at 6 months' sight is at 1s. 10d. per rupee.   By
     depositing in a bank for 6 months, certain interest can be

had at rate of 3 per cent. per annum; at the end of the 6 months' exchange *at sight* is 1s. 9½d. per rupee.

What is the gain or loss *per cent.* on remitting (from India) either 1° at 6 months' sight ; or 2° depositing at interest for 6 months, and then remitting *at sight.*

3. A cistern can be filled by two pipes, A, B, in 4 and 5 *minutes* respectively, and emptied by C in 144 *seconds.* B is opened 2 minutes after A ; C is opened 1 minute after B The cistern contains 361 gallons just before C is opened In what time will it be filled or emptied after opening of C ?

4 The prime cost of a 50 gallon cask of wine is £725, and 10 gallons are lost by leakage · at what price must the remainder be sold so as to gain 10 per cent. on the whole original cost?

5. If 3 men can mow 7 acres of grass in 5 days of 9 hours each, in how many days of 8 hours each will 5 men mow 17½ acres ?

6. What is the present worth of a lakh of rupees due two years, at 10 per cent. per annum, compound interest ?

VI.—(1876-77).

1. Add 27₁¹₂, 13⅜, 1¾, 4

2 What part of 4½ guineas is 5½ of ₁⁹₅ of £14 ?

Find the value of (·36÷1·78) (5·93÷·072).

3. If 3 per cent. be lost by selling tea at 1s. 8d per ℔, at what price must it be sold to gain 3 per cent. ?

4. Four merchants A, B, C, D trade together ; A's stock of £400 was in trade 12 months, B's stock of £450 for 9 months, C's stock of £480 for 8 months, and D's of £405 for 6 months. The whole profit being £1000, was in trade 12 months. How much ought each to receive ?

5. A sum of £3750 was sold out of the 3 per. cents. at 95, and put out at compound interest for 2 years at 4 per cent, the amount being then invested in 3½ per cent. at 104 Find the alteration in income.

6 A full cistern can be emptied by one pipe in 30 minutes, and
   filled by another in 48 minutes. If the first is turned on
   for 8 minutes, and then the second also, in what time will
   the cistern be emptied?

7 A piece of work can be done in one day of 8 hours by 3 men
   or 7 women or 11 boys. In what time can it be done by
   1 man, 2 women and 5 boys together?

8 Express 2½ Spanish piastres in German money, exchange being
   at the rate of 20½ marks for £1, and £3. 7s. 6d. for 20
   piastres.

VII.—(1877-'78).

1 Write down Troy and Avoirdupois weights, and length and
   surface measures.

2 Write in Figures, Three billion, four thousand seven hundred
   and two millions, one hundred and thirty-six thousand,
   seven hundred and twenty-one.

   Write in words—43287000006321.

   And the Roman Numerals—1234, 1567, 1853 and 1999.

2 Find the cube of 4173 and fourth power of 3279.

3 Add together $\frac{1}{7}$ of £2446 13s. 9d., ½ of £697, 4s. 3½d. ⅓ of
   £1501, 9s, 0¾d. and ¼ of 3069rs. 11as. 6p. when the rupee
   is worth 2 shillings.

4 A farm was rented at 16rs. 12as. an acre, but when one-tenth
   was taken off the rent, it came to 3768rs. 12as. How
   many acres where there in the farm?

5 Find the compound interest on 3331rs. 10as. at 3½ per cent.
   for three years.

6 State the rules for multiplication and division of decimals.
   Multiply ·017 by 17 and divide ·06 by a million.

7 Find the value of 23 acres 3 roods 6 poles, divided by $\frac{7}{4}$, and
   $\frac{9}{21}$ of 15 cubic yards, 20 feet 140 inches.

8 Extract the square root of 49519369, and the cube root of
   350253536649.

9. State and prove the rule of reducing a circulating decimal, both pure and mixed, to a vulgar fraction. Reduce ·3079 and 9 to vulgar fractions.

10. Four Merchants A,B,C,D trade together—A's stock was Rs. 2000 and was in the trade a year, B's was Rs. 3300 for 10 months. C's was Rs 3750 for 8 months and D's Rs. 3950 for 6 months. They divided the profit of Rs. 7230 in proportion to capital and time. What was the share of each?

VII.—(1879-80.)

1. Simplify $\dfrac{\dfrac{3\frac{1}{2}}{7\frac{1}{2}} - \dfrac{1}{2\frac{2}{3}}}{4\frac{1}{2} \text{ of } \dfrac{2\frac{3}{4}}{6\frac{1}{4}}}$ of $\dfrac{11\frac{1}{2}}{17} \times 52\frac{1}{11}$.

2. Reduce $\dfrac{2\cdot8 \text{ of } 2\cdot27}{1\cdot1\dot{3}\dot{6}} + \dfrac{4\cdot4 - 2\cdot83}{1\cdot6 + 2\cdot6\dot{2}\dot{9}}$ of $\dfrac{6\cdot8 \text{ of } 3}{2\cdot25}$ to a simple quantity.

3. If a wall 320 yards long, 9 feet high, and 22½ inches thick be built by 10 men in 45 days of 12 hours each; in how many days of 14 hours each would 60 men build a wall 14 feet high, 2¼ feet thick round a park 3½ miles in circumference?

4. An estate of 134 acres, 3 roods, 16 poles is rented at £2. 12s. 6d. per acre, and afterwards the best pasture, consisting of 51 acres, 2 roods, 12 poles, is let at £3. 10s. per acre; find by practice what the first tenant will still have to make up of his rent.

5. What would a banker gain by discounting on September 21st a bill of £318. 3s. 0d., dated July 31st. at 4 months, at 5 per cent.?

6. For what sum should goods, worth £4384. 0s. 3d., be insured at £2. 6s.8d. per cent., that the owner may recover, in case of loss, the value both of goods and premium?

7. Find the square root of ·01595169.

8. A, B and C are in partnership, and ⅔ of A's share is equal to ⅓ of B's or ¼ of C's, and is Rs. 250 less than B's. What is each man's share?

9. In the Centigrade thermometer the freezing point is zero, and the boiling point is 100°; in Fahrenheit's the freezing point is 32°, and the boiling point is 212°; what degree Centigrade corresponds to 68° Fahrenheit?

10. There is a piece of work which 8 men working in pairs would accomplish in 20 days, and working singly in 30 days. One man is engaged on the work for 25 days, at the end of which time 7 men arrive to his assistance, and continue at the work for 4 days, when they are strengthened by the arrival of 7 men more. In what time would the work be finished, supposing all the men to continue at work, and to operate in pairs wherever practicable?

THOMASON CIVIL ENGINEERING COLLEGE

ENTRANCE EXAMINATION PAPERS.

———◇◇◇———

UPPER SUBORDINATE CLASSES.

ARITHMETIC.

I.—(1872-73) & (1875-76).

1. Find the sum of 2½, 3¾, 4¾, 5⅘, 6⅞, 7⅞, 8¼, 9⅗ both by vulgar fractions and decimals.

2. Reduce ¾ of 21 rupees 9 annas, to the decimal of 5 gold mohurs and find the value of ·875 rupees in annas &c.
  N. B.—The gold mohur = Rs. 16.

3. Divide ·30572355 by ·0093; and multiply together ·00015 and 15·5; and extract the square root of the product to four places of decimals.

8

4   If I buy 31 gallons 3 quarts an 12 pints of beer, at the rate
    of 36 rupees 15 annas 4 pie for 54 gallons, and sell it
    again at a profit of 25 per cent, what is my actual
    gain?

5   A watch is 5 minutes fast at noon on the first of the month,
    on the 11th at true noon it shows 12 hours 55 minutes.
    Find its rate of gaining; and the true time to the nearest
    second, when the watch shows 5 minutes past noon on the
    16th.

6   A cistern is provided with three spouts A, B, and C. A can
    fill it in 30 minutes, B in 10, and C can empty it in 2
    hours. If A, C, and B be opened successively for a minute
    each, in what time will the cistern be filled; and how
    much more water than the content of the cistern will have
    passed through it?

7   If 21 men can in 12 days make 1260 thousand bricks, working
    12 hours a day, in how many days of 8 hours each, can 59
    men make 177 lakhs of bricks?

II.—(1874-75).

1   Simplify the following expressions :—

$$\tfrac{1}{26}\left(5\tfrac{1}{2}-2\tfrac{1}{4}\right)+\left(5\tfrac{1}{4}\ of.\tfrac{9}{126}\ -\tfrac{9}{4}\ of\ \tfrac{3}{4}\right)-\left(\ \frac{1}{1\tfrac{1}{4}}\ -\ \frac{1\tfrac{1}{4}}{3}\ \right)$$

$$\cdot\ \left(2-\tfrac{1}{3}\right)\ \text{and}\ 2\tfrac{1}{4}+\ \cfrac{1}{3\tfrac{1}{4}+\cfrac{1}{1\tfrac{1}{4}}}.$$

2   If 3 men, 2 women and 6 children, or 4 men and 7 children,
    can dig 125 cubic feet of earth in 6 days: how many cubic
    feet would 4 men 4 women and 4 children dig in 20 days,
    two women being supposed to do as much as three children?

3   There is a leak in the bottom of a cistern. When the cistern
    was in thorough repair it could be filled in ¾ of an hour. It
    now takes 10 minutes longer. If the cistern were full how
    long would it be in leaking itself empty?

4. A man buys goods for Rs. 1,364 and sells half of them so as to gain 6 per cent., for what must he sell the remainder in order to gain 15 per cent. on the whole?

5. Three parties agree to advance £14,280 for business purposes, in the several proportions of 4, 5 and 6 · the clear gain is £872 10s. 0d. What amount of capital and gain belongs to each?

6. Find the value of

$$\left(1\tfrac{1}{2} - \sqrt{\tfrac{1}{9}}\right) \div \sqrt[3]{\frac{216}{7}}$$

7. The wholesale price of books is 25 per cent. lower than the retail price, and 13 books are counted in to the dozen. What per centage is obtained by the retailer?

IV.—(1876-77).

1. Reduce $\tfrac{4155}{10305}$ to its lowest terms and £1. 15s. 6d. to the fraction of a guinea. Find the value of $\tfrac{24}{11}$ of half a guinea, and add together $\tfrac{1}{3}$, $\tfrac{2}{5}$ of $\tfrac{10}{9}$, $1\tfrac{1}{2}$, and $3 \div 2\tfrac{2}{5}$.

Find the difference between 17 42857i sq. ft and 100 i sq. in ; and between 1·76 cub. yds. and 26 66 cub. ft

3. Find by practice, the cost of replacing a cistern to weigh 8 cwt. 2 qrs. 14lbs. at the rate of £2. 0s 6d. per cwt. if the plumber allows £1.11s. 6d. per cwt. for the lead of the old one, which weighs 6 cwt. 1 qr. 10 lbs.

4. If 12 men build 24 rods of wall in 30 days, working 8 hours a day, how many hours a day must 18 men work to build 72 rods in 40 days?

5. I bought 128 yards of cloth for £100 and am now obliged to sell it at a loss of as much money as I shall receive for one dozen yards. At what do I sell it per yard?

6. Extract the square root of $1\tfrac{60}{139}$, and the cube root of 1953125.

7   A person invested £1000 in the 3 per cents, at $90\frac{5}{8}$, but the price rising to $91\frac{1}{4}$, he sold out, and invested the proceeds in the $3\frac{1}{2}$ per cents. at $97\frac{1}{4}$. Find the increase in his income.

V.—(1877-78).

1.   Expres $\dfrac{2\cdot5 \times 1\cdot\dot{6}}{3\cdot\dot{6} - 2\cdot5}$ of $\dfrac{4\cdot2\dot{6} \text{ of } 2\cdot265}{\dot{5}\cdot2 - \cdot4\cdot5}$ ÷ $57\cdot142857$ by a

vulgar fraction in its simplest form.

2.   A person owes a guinea to each of four creditors : to one he pays $\frac{1}{2}$ of his debt, to another $\frac{1}{4}$, to another $\frac{1}{5}$, and to another $\frac{12}{18}$, what will he still owe altogether ?

3.   Extract the square root of $756\cdot305001$, and the cube root of $\cdot000250047$, each to three places of decimals.

4.   If I buy 3 per cents. at $78\frac{1}{2}$, and $3\frac{1}{2}$ at $95\frac{3}{16}$, which is the best investment ? If I had invested £6962 19s. $3\frac{1}{4}d$. in each, and the former rose and latter fell $\frac{1}{16}$, how much should I lose or gain ?

5.   For what sum should a cargo, worth £5263, be insured at $7\frac{3}{4}$ per cent, so that the owner may recover, in case of loss, the value both of cargo and premium ?

6.   Find by practice, the value in English money of 2016 Rs. 4 As. 4 P. exchange being at 2s. $1\frac{1}{4}d$.

7.   If the wages of 25 men amount to £76 13s. $4d$. in 16 days, how many men must work 24 days to receive £103. 10s. $0d$., the daily wages of the latter being one-half those of the former ?

VI.—(1879-80).

1.   Reduce $\dfrac{2\frac{1}{2}}{3\frac{1}{4}} + \dfrac{1\frac{1}{2} - \frac{5}{8}}{1\frac{1}{2} + \frac{5}{8}} - 1\frac{3}{30}$ to a simple fraction.

2.   Reduce $\dfrac{7\cdot5 \times 5\cdot40\dot{4}\dot{1}}{27\frac{3}{11} \text{ of } 9\cdot61538}$ of $\dfrac{4\cdot092307 \times \cdot0\dot{3}}{3\frac{1}{2} \text{ of } 1\frac{4}{7}}$ to a simple

decimal fraction.

3. Find by practice the cost of 218 cwt. 3qrs. 8 ℔s. at £7. 5s. 4d. per cwt.

4. One-third of my money is equal to ½ of C's and ⅓ of C's is equal to ⅔ of B's; B gives to me ⅓ of his money and to C ⅓ of the remainder, and has 2s. 6d. left. What amount had each at first ?

5. A tradesman lost 4 per cent., by selling an article for 15 shillings; what should he have sold it for so as to gain 10 per cent.?

6. The average of 21 results is 61, that of the first eight being 64, and of the next eleven 59. Find the average of the last two.

7. A person invests £6,200 in the 3 per cents. at 89¼ and pays income tax 10d. in the pound ; on the stock rising to 92 he sells out, and invests the proceeds in £50 railway shares which yield an annual dividend of 3¼ per cent., clear of income tax. Find the alteration in his income.

THOMASON CIVIL ENGINEERING COLLEGE

MISCELLANEOUS EXAMINATION PAPERS.

ARITHMETIC.

I.—(1870) to (1880).

1 (a) Reduce $\dfrac{2\cdot 3 - 1\cdot 4}{\cdot 09 \text{ of } 587}$ to an equivalent vulgar fraction in its lowest terms.

   (b) Add together ½ (2½rs. + 4¼as.) and ⅓ (1·3rs. + 4·09as.)

2   A contract is to be finished in 200 days and 50 men are put on to work at once : at the end of ⅔ of this time, it is found that only ½ of the work is done. What extra number of hands will be required to complete the contract in the given time ; the last employed men to work 12 hours per day, whilst the first 50 men work until the contract is finished, only 10 hours per day ?

3   If a person can walk 26 miles 2 furlongs 7¼ yards in 7 hours 13 minutes 20 seconds, how long will a second person be in walking 36 miles 6 furlongs 10¼ yards supposing that the first walks 3¾ miles while the second walks 3¼ ?

4. A tradesman bought a quantity of goods, and sold ⅔ of them at a profit of 6 per cent.. the price rising he got 10 per cent. profit on the remainder, and on the whole gained £114 : what sum did he lay out?

5   A person having invested a sum of money in the 3 per cents. receive annually therefrom £232 after deducting the income tax of 7d. in the pound. Find the amount of stock, and also what it can be sold for when the 3½ per cents. are at 109⅞.

6   Find the discount on £1000 due two years hence, at 4 per cent. compound interest.

    A person borrows £1200 at 4 per cent., which he wishes to pay off in 3 equal yearly instalments commencing at the end of the first year ; what ought he to pay yearly to effect this ?

7   A merchant receives a bill on London at 3 months, of Rs. 3,000, which he keeps till maturity, and then exchanges at the rate of 1s. 10½d. per rupee ; when he finds he receives as much as he would have done had he discounted the bill when drawn at 4 per cent. ; what was the rate of exchange when the bill was drawn ?

II.

1. Reduce the expression $\left(\dfrac{3\frac{1}{2}}{7} + \dfrac{2}{10\frac{1}{4}} + \dfrac{5}{13}\text{ of }\frac{4}{5}\right) + \frac{4}{5}$ to its simplest form; and find the value of £$\frac{3}{8}-\frac{7}{15}$ of a guinea $+\frac{11}{13}$ of 2s. 6d.

2. Bought 30 gallons of brandy for £24; at what price per quart must I retail it so as to gain 15s. on the whole; and what price per gallon so as to gain 20 per cent. ?

3. Find the difference between the simple and compound interest of Rs. 2000 for 3 years, at 2½ per cent.

4. How many persons will £8 17s. 6d. support for 4 weeks 5 days, when 11 people can be supported 2½ weeks on £3. 13s. 11½d. ?

5. Divide 320 nuts among 3 boys A, B and C, in such a way that as often as A receives 8, B shall receive 5, and for every 6 B receives C shall receive 10.

6. A bill for £202. 10s. was drawn on March 2nd, at 7 months; what will it be worth on May 12th, discount being calculated at 3½ per cent. ?

7. A vessel can be filled by one pipe in 5 hours, by a second in 6 hours, and emptied by a third in 12 hours. All three are opened for 1 hour, when the first is shut off. How long will the vessel take to be filled, if the other two are left running?

8. A room is 18 feet 7 inches long, 14 feet 3 inches in height, and 14 feet 3 inches wide; what will it cost to paper its walls, the paper being ½ wide, and costing 2½d. a yard, deducting for four windows, each 12 feet high, and 3 feet 6 inches wide.

III.

1. Reduce to its simplest form as a vulgar fraction :—

$$\dfrac{\frac{1}{2}\text{ of }4\cdot285714 + \frac{3}{14}\text{ of }\cdot25}{\frac{2}{3}\text{ of }4\frac{1}{2}\text{ of }7\cdot7} + \frac{99}{115}.$$

2   Divide the difference of $\frac{3}{7}$ and ·70$\dot{1}$ by the sum of $2\frac{1}{2}$ of $\frac{9}{11}$, · and 2·4 of $\frac{9}{9}$, and find what decimal of 3 the quotient is.

3   If 2 horses be equal in value to 7 bullocks, and 3 bullocks to 5 sheep, and the price of a sheep be Rs. £.·, what is the value of 10 horses?

4   Find by practice the value of 12 cwt 3qrs 11 lbs. at Rs. 4-7-2 per cwt.

5   If a thousand men, besieged in a town, with provision for 5 weeks, allowing each man 16 ounces a day, be reinforced by 500 men more, and have their daily allowance reduced to 6$\frac{3}{4}$ ounces; how long will the provisions last them?

6   Bought a quantity of tea and sold part of it at the rate of Rs. 1-0-6 per lb. losing thereby 1 per cent, what was gained per cent. on the tea, which was sold at Rs. 1-1-6?

7   What is the difference between *true discount* and *banker's discount*? What is the true discount upon Rs. 3,452-0-11 for 3 months, at 6 per cent.?

8   An investment was made by a certain person in the 4 per cents when they were selling at 20 discount; twelve months afterwards, when they were selling at 10 discount he sold out; what interest did he get upon his investment?

9   In a firm A invests half as much again as B, and $\frac{1}{4}$ as much again as C, and A's capital is Rs. 1,200 more than C's. They gain Rs 1,330; what is the each man's share of the profits?

10 If A can reap $\frac{4}{5}$ of a field in 2$\frac{1}{4}$ days, and B can reap $\frac{3}{4}$ of it in 4$\frac{1}{2}$ days; in what time will A and B reap the whole field together?

IV.

1   Define a unit, number, arithmetic. What is the difference between abstract and concrete numbers. What is a prime number?

The quotient arising from the division of 9281 by a certain number is 17, and the remainder is 37 8. Find the divisor.

3 Find the value of

(1) $\left\{ 1\frac{1}{4} + \frac{1}{2} \text{ of } \frac{7}{19} - \frac{5}{9} \right\} \div \frac{30.5}{24.5}.$

(2) $\frac{7}{8}$ of a ton $+ \frac{5}{8}$ of a cwt. $+ \frac{2}{3}$lb.

(3) Reduce $7\frac{17}{23}$ pies to the fraction of a "gold mohur."

A person has ·1875 part of a house, he sells ·17 part of his share; what fractional part of the house has he still left?

5. Show that $\dfrac{\cdot375 \times \cdot375 - \cdot025 \times \cdot025}{\cdot375 - \cdot025}$ $\frac{2}{5}$ and that

$3 + \dfrac{1}{7+\frac{1}{16}} = 3.14159$ nearly.

6. A *cistern* is fed by a spout which can fill it in 2 hours; how long would it take to fill it if the cistern has a leak that would empty it in 10 hours?

7 A pound of powder costs 3s and the charge of a gun is $2\frac{1}{4}$ drams; how many shots will 6s 9d. worth of powder furnish? And what will be the cost of powder for 2560 shots?

8. A person in India wishes to invest Rs. 24,000 in the 3 per cent. consols at 90; the rate of exchange is 1s. 10d. for a rupee, brokerage in England is $\frac{1}{8}$th per cent.: how much stock would he realize, and what would be his yearly income?

9. A can do a piece of work in 27 days and B in 15 days; A works at it alone for 12 days, B then works 5 days, and afterwards C finishes it in 4 days; in what time could C have done the whole work?

10. Find the square root of 167·9616. Find the side of a square field equal in area to a rectangular field 700 yards wide and 2800 yards long.

11. Two persons buy postage stamps at 12 a shilling; one re-tails them at 11 a shilling: the other charges 13d. a dozen. Compare their gains in selling the same number of stamps.

V.

1. Find the value of $\dfrac{2}{+1\atop +5+\frac{4}{7}} + \left\{\left(2\frac{1}{4}+\dfrac{5}{3\frac{1}{4}\text{ of }\frac{1}{4}} ~~ \dfrac{2\frac{1}{4}}{3\frac{1}{4}}\right)\cdot 1\frac{1}{4}\right\}$

2. Divide 1001 by 000390625.

3. Reduce $\dfrac{2\,375}{3\,16}\text{ of }\dfrac{4\,4}{0625}$ ~~ $\dfrac{9\frac{4}{5}}{7}\text{ of }\dfrac{4}{5\,625}$ to a simple quantity.

4. Find the value of $\frac{2}{7}$ of £2 7s. 8½ l., and $\frac{1}{10}$ of £1 6s. 8d. and reduce their difference to the decimal of £20.

5. Find the cubic content, in feet and inches, by duodecimals, of a cistern 9'3" × 11'5" × 3'2".

6. If a person travel 1800 miles in 7 days of 16 hours each, in how many days of 12 hours each will he travel the same distance?

7. If the carriage of 30 maunds, through 36 miles cost Rs 12, what weight ought to be carried 48 miles for Rs. 66-10-8.

8. Find by practice what is the dividend on £1022 17s. 10½d. at 2s. 11¾d. in the pound.

9. Water being composed of the gases oxygen and hydrogen, in proportion of 88 9 to 11 1, what weight of each is there in a cubic foot (1000 oz.) of water.

10. At what times between 2 and 3 o'clock are the hour and minute hands of a clock together, at right angles, and in opposite directions?

11. A person has £2950 in the 3 per cents. at 75¼, which he transfers to the 5 per cents. at 110¾, what was the alteration in his income?

12. A building worth Rs. 9000 was burnt of which ⅓ belonged to A, ¼ to B, and the rest to C, what loss will each sustain supposing that Rs. 5400 of the value of the house were insured?

VI

1　What are decimals？Reduce £24 18s 6⅞d to the decimal of £100, add to it £10, and reduce the sum to figures and decimal of 1 shilling．

2　Find the product of 18988 and 860 × 7 ÷ 0.235 ÷ subtract the price of 868 from the quotes

3　Reduce ⅞ of £1 less of a given rate to a fraction (value of 10s 6d, and express ⅜ to ton of £7 the difference between £7 and ½ of £7

4　Find the cost of executing 50 different ways about 1000 feet 9 inch long, 3 feet 9 inches broad and 2 feet 18 inch ½ deep at Rs 110 per cent of feet　(Be deduced cards and practice)

5　By selling tea at Rs 540 a ... ... cents ½ of what other He also raised the profits to 6 per cent．What does he now gain per cent and what is his total amount he sell 100 cents at the rate？

6　A person spending annually Rs 2400 saves Rs 25 qr of the by ready payments．If by this means he increases his annual saving 20 per cent, what is his income？

7　In the 3 per cent stock is at £87, and the 3½ at £92 which is the most advantageous investment？And if I have £3000 stock in the least advantageous, and I wish to change it into the other, how many £100 shares of stock shall I obtain？Brokerage of £½ per cent being charged on all transactions

8　If 4 men and two boys can paper a room 23 feet long, 19 broad, and 16 high, with paper 2 feet 8 inches broad, in 7 days, working 12 hours a day, in how many days of 9 hours each can 4 men and 4 boys paper 3 rooms, each 27 feet long, 32 broad and 15 high, with paper 3 feet broad, a boy working being 25 per cent of a man's

10　What income shall I obtain, in England from Rs 78000 in Indian Government bonds at 5½ per cent when my agents in Calcutta charge me 3 per cent for drawing and remitting it and the exchange on England, is 1s 10½d for the rupee

VII.

1. Reduce $1 + \cfrac{\cfrac{2}{3\frac{1}{4}}}{\cfrac{2}{3\frac{1}{5}}}, \left(1 + \cfrac{4}{9 - \cfrac{3}{}}\right)$ to a decimal.

2. Find the vulgar fraction equivalent to the following Recurring decimals, $\cdot 478\dot{6}$; $\cdot 2\dot{5}$; and $\cdot 3\dot{7}$.

3. Extract the square root of 16803·9369.

4. If 118½ yards of cloth. 1 yard wide, cost £332. 5s. find how much cloth of the same quality, but only 18 inches wide, can be purchased for £59 4s. ?

5. It 9 tons 7½ cwt. of iron be sold for £245, and the gain on the original cost be 20 per cent, what did the iron cost per cwt ?

6. Find the amount of £1000 placed out at simple interest at 3½ per cent. for 30 years. Also find the present value of £1000 due 30 years hence at the same rate.

7. A cistern is supplied by 4 taps which would fill it (if empty) in 3, 4, 5 and 6 hours, respectively, and discharged by two others which would empty it (if full) in 2½ and 3¾ hours respectively. Suppose the cistern empty, and all the taps open; how long would it be in filling?

VIII.

1. What are circulating decimals? Distinguish those vulgar fractions that are convertible into terminating decimals and show that all others are convertible into recurring decimals.

2. Give the rule for reducing any circulator to a fraction. Find the fractional values of $-\cdot 00876\dot{3}$ and $4\cdot 053\dot{1}$?

3. To complete a piece of work, B would take twice as long as A and C together, and C thrice as long as A and B together. A, B, C by their united exertions can do it in 5 days In what time could each do it by himself?

4. Define "Interest," "Discount," "Present Value" and "Stock." What is the present value of 800 gns. due 20 years hence 5 per cent ?

A man had £10000 of 3 per cent. stock which he sold out at 72. He placed one-half into the 4 per cent. at 80 and the other half into the 5 per cent. at 90. The former having fallen to 76, he transferred his stock from them to the 5½ per cents. at 95. State the difference between his present and his original income.

IX.

1 Simplify the following expressions : —

$$\tfrac{1}{5}\left(5\tfrac{1}{2}-2\tfrac{1}{4}\right)+\left(5\tfrac{1}{4}\text{ of }\tfrac{9}{128}\div\tfrac{2}{3}\text{ of }\tfrac{3}{4}\right)-\left(\tfrac{|1}{1\tfrac{1}{4}}--\tfrac{1\tfrac{1}{4}}{6}\right)\div\left(2-\tfrac{1}{2}\right)$$

and $7\tfrac{3}{13}$ of $\dfrac{1}{10+\dfrac{1}{3+}}$. The answer to be in fractions in their simplest form.

2. Express $\dfrac{2\cdot5\times1\cdot6}{3\cdot6-2\cdot5}$ of $\dfrac{4\cdot26\text{ of }2\cdot625}{5\cdot2-4\cdot5}\div57\,142857$ by a vulgar fraction.

3 A set of four bells ring at intervals of $3\tfrac{1}{2}$, $4\tfrac{1}{2}$, 5 and 9 seconds respectively for each bell; how often during 24 hours will the four bells ring together ?

4 If one watch gain, and another lose, at the rate of a minute a day, and they, are both set right at noon on Monday, what time will be indicated by the latter when the former points 7 hours 11½ min. on the following Friday morning ? Also what is the correct time ?

5 Bought a quantity of tea, and sold part of it at the rate of Rs. 1 0-6 per lb., losing thereby 1 per cent. What was gained per cent. on the remainder which was sold at Rs. 1-1-6 ?

6 If 25 men do a piece of work in 24 days working 8 hrs. a day, how many hours a day would 30 men have to work in order to do the same piece of work in 16 days ?

A person. invests a certain sum in the 3 per cents. when they are at 96¼, had he waited till they had fallen to 96¼, he would have obtained £16 more of stock. How much money did he invest, ⅛ per cent. being charged as brokerage in both cases?

8. Find the values of $\dfrac{1}{\sqrt{11}}$ and $\dfrac{\sqrt[3]{7}}{\sqrt{9}}$

9. If a person owes Rs. 1000 on the 1st May, at what date ought he to pay Rs. 750 so that he may retain the remaining Rs 250 till the 1st October?

10. Gun metal is composed of 9 parts of copper to one of tin and bell-metal is equal to 80 parts of copper. to 10·1 of tin, 5·6 of zinc and 4·3 of lead. What quantity of zinc, lead and tin must be added to 24 tons of gun-metal to convert it into bell-metal. Give the answer in ton?

X.

1   Reduce the following fractions to their simplest form

$$9\tfrac{1}{12} \atop 11\tfrac{9}{12} \left\{ 2\tfrac{5}{17} - \tfrac{1\tfrac{1}{4}}{19\tfrac{1}{2}} \right\} \div \tfrac{2\tfrac{2}{5}}{3\tfrac{2}{5}} \text{ and } 3\tfrac{1}{2} + \cfrac{2\tfrac{1}{4}}{3\tfrac{1}{4} + \cfrac{}{5\tfrac{1}{2} + \cfrac{}{4\tfrac{1}{2}}}}$$

2. Divide the difference of ⅛, ⅞ and ·70i by the sum of 2½ of ₁ᵗ₁ and 2·i of ⅔, and find what decimal of 3 the quotient is?

3., If the driving wheel of a railway engine be 16 feet in circumference, and the velocity of the engine 25 miles an hour, how many revolutions does the wheel make in 5 minutes?

4   A regiment of 1000 men are to have new coats; each coat is to contain 2¼ yds. of cloth 1¼ yds wide, and to be lined with shalloon ⅞ in. wide; how many yards of shalloon will be required?

5 If 20 masons build a wall 5 feet long, 2 feet thick, and 14 feet high, in 12 days of 7 hours each ; in how many days of 10 hours each will 60 masons build a wall 500 feet long, 4 thick and 16 high?

6 What principal put out at compound interest, for 2 years and 6 months at 6 per cent. will amount to Rs. 10,000?

7 Two straight rods, each 1 foot in length, divided into 11, and 12 equal parts respectively, are placed side by side with their ends together. What fraction of an inch would the distance of the third division of the first be from the third division of the second?

8 What amount of money invested in the five per cents. at par would realize the same income as Rs. 10,018 invested in the five and a half per cents at 103?

9 What fraction of $\frac{2}{3}$ of $1\frac{2}{7}$ is equal to ·5060?

10. There are two numbers, the first of which is ·53 of the second, and the difference is 14. Find the numbers.

XI.

1. What is a " fraction," " improper fraction," and " continued fraction? "

   What fraction of £1 is 3 annas 4 pie, when a rupee is worth 1s. 11¼d.?

   Find the sum, difference, product, and quotient of

   $$2 \qquad \frac{4}{3} \quad \text{expressed in decimals.}$$

2 Find the cost of 3 tons 17 cwt. 3 qrs. 23 lbs. 11 ozs. of iron at Rs. 9-13-7 per cwt.

3. A and B can do a piece of work, each, in 24 days: A and B work together for 6 days, when B goes away and C works with A for 3 days, then B rejoin them, and the work is finished in 2 days more. How long would it have taken A, B and C to do the piece of work, if they had all worked together?

4   A owes Rs. 356° and Rs. 743, to be paid in 10 months, and
2½ years respectively. At what time should A pay the
'whole in a lump sum, to clear off the debt, so that neither
may lose by the transaction ? Simple interest being taken.

XII.

1.   Simplify the following expressions :—

$$\frac{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}{\frac{1}{2\frac{1}{2}}+\frac{1}{3\frac{1}{2}}+\frac{1}{4\frac{1}{2}}} \quad \text{or} \quad \frac{1}{1\frac{1}{3}} \quad \text{of} \quad 1+\frac{\frac{1}{2}}{3+\frac{1}{2}}$$

2   Reduce the following pure and mixed circulating decimals to
vulgar fractions —explain which is which—and give fully
the reasons for the steps taken for the reduction to the
forms of a fraction in each case—

(a) $\cdot 3\dot{6}$ (b) $\cdot 1\dot{2}\dot{7}$.

3.   Find the value of $\cdot 375$ of a guinea $+\cdot 5\dot{4}$ of 8s $3d. +\cdot 027$ f
£2 15s.

4.   A person rows a distance of 1½ miles *down* a stream in 20
minutes, but without the aid of the stream it would have
taken him half an hour; what is the rate of the stream
per hour? and how long would it take him to return
against it ?

5.   If 26 (linear) yards of butter cost 48 shillings, what must it
be sold at per (linear) foot in order to gain 4 shillings on
the purchase ?

6.   A can do as much work in 5 hours as B can do in 6 hours, or
as C can do in 9 hours ; how long will it take C to com-
plete a piece of work one-half of which has been done by
A working 12 hours, and B working 24 hours ?

7,   Find the present worth of £1250, due 3 months hence, at 3½
per cent. per annum simple interest.

8   Find the discount on £55 due 146 days hence at 4¾ per cent.
     simple interest.

9.   Find the square root of 579·864 and the cube root of 389017.

XIII.

1.   Multiply ·315 by ·037—Divide ·0359432 by ·7100 and reduce

     ·0381 to its equivalent fraction.

2   When is a fraction said to be in its lowest terms? Explain
     the meaning of the symbol ⅔?

     Simplify $\dfrac{\frac{3}{4} \text{ of } \frac{4}{5} \text{ of } \frac{3.8}{4.7}}{\frac{1}{4} \text{ of } \frac{3}{4} \text{ of } \frac{8.4}{5.1}}$ and take the result from the

     sum of 10¾, 3₁³₀ and 7⅞⅘.

3   Find the values of ⅔ of £15+⅝ of $\dfrac{1}{2\frac{1}{8}}$ of·£1. 12s.+⅓ of 3d.

     Reduce one oz. troy to the fraction of an oz. avoirdupois

4.   Express the value of ·83 of 8s.+·05 of 2 guineas+1·8 of 5s.
     as the decimal of half a guinea. Add 5½ cwt. to 3·125 qrs.
     and reduce the sum to the decimal of a ton.

5   Find by Duodecimals the capacity of a cistern, whose length
     depth and breadth are 7 feet 3 inches, 3 feet 8 inches and
     2 feet 10-inches respectively; and prove the truth of the
     result by vulgar fractions.

6   Extract the square root of ·0050722884; and find within an
     inch the length of the side of a square field, the area of
     which is two acres.

7.   If the six penny loaf weigh 4·35 lbs when wheat is at 5·75s.
     per bushel; what weight of bread ought to be purchased
     for 18·13s. when wheat is at 18·4s. per bushel?

8. A and B each lend £256 for three years at $4\frac{1}{2}$ per cent. per annum; one at simple interest, and the other at compound interest. Find the difference in the amount of interest they receive.

9. A can run at the rate of 8 mil s an hour B at the rate of $7\frac{1}{2}$ miles an hour; what is the greatest number of yards start that A can give B so as to beat him in a race of 440 yards?

10. A person rents a piece of land for £120 a year. He lays out £625 in buying 50 bullocks. At the end of the year he sells them, having expended £12. 10s. in labour. How much per head must he gain by them in order to realize his rent and expenses, and 10 per cent. on his original outlay?

XIV.

1. Add $1\cdot428571$, $\frac{1}{33}$, $\frac{1}{43}$.

2. Reduce £·6 + ·3125s.+·2 of a guinea to Indian currency counting one rupee as $1s.$ $10\frac{1}{4}d$.

3. If 18 men can dig a trench 30 yards long in $2\frac{1}{2}$ days working 8 hours a day; how many will dig a trench 60 yards long in 64 days working 6 hours a day?

4. What sum must be invested in the 3 per cents. at $94\frac{1}{4}$ to yield an annual income of Rs. 5,000?

5. A can do a piece of work in 10 days; A and B can do it, together in 7 days: in what time could B alone do it?

6. A person buys tea at Rs. 3 and 4 the seer, and mixes them in the proportion of 4 : 7; what will he gain per cent., by selling at Rs. 3·6 per seer.

XV.

1.—(a) Find the value of

$$\frac{\frac{7\cdot2}{1\cdot7} + \frac{1}{4}}{3 - \frac{1}{4}} \times (\frac{1}{2} + \frac{1}{4}) \text{ expressed in decimals.}$$

(b) Find the value of $\frac{3}{4}$ of £4. 12s. 10$\frac{3}{4}$d. in rupees, annas
and pies when the value of the rupee is 1s. 10$\frac{3}{4}$d.

2. A merchant having Rs. 50,000 to invest, expends a propor-
tion of $\frac{1}{3}$ pie in the rupee, in purchase of building land at
Rs. 60-4-9 per acre, and a proportion of 7a. 2p. in the
rupee in iron, at Rs. 10-2-5 per cwt. How much of each
did he obtain; and what will be the interest for 2$\frac{1}{2}$ years
on the balance of his capital, at 4$\frac{1}{2}$ per cent. ?

3. By selling a horse for £116. 17s. a person loses 5 per cent.
What would be his gain or loss per cent., if he sell him
for £132. 4s. 6d.?

4. If 48 men, working 8 hours a day, for one week, can dig a
trench 235 feet long, 40 feet wide, and 28 feet deep; in
what time can 12 men, working 10 hours a day, form a
railway cutting containing 4,213,620 cubic feet?

XVI.

1. Explain what is meant by the terms "Factor," "Greatest
Common Measure" "Least Common Multiple." Find the
Least Common Multiple of 18, 28, 30, 42.

2. (a) What number added to $\frac{5}{7} + \frac{9}{12}$ will give 2$\frac{1}{4}$?

(b) Reduce the expression $\left(\dfrac{3\frac{1}{3}}{7} + \dfrac{2}{10\frac{1}{2}} - \dfrac{5}{6} \text{ of } \dfrac{4}{7} \right)$

$\times$ 1$\frac{3}{4}$ to its simplest form.

3. State the rule for the multiplication of decimals and find the
continued product of 1, ·01, ·001, and 100.

4. Convert $\frac{2}{3} + 3\frac{1}{2} + 2\frac{9}{10} + 6\frac{11}{12}$ into a whole number and a deci-
mal.

Also find the sum, difference, product and quotient of 1·015
and ·01015.

5. Express ·857142 as a vulgar fraction. What kind of a decimal
is the above called?

Also express the difference between 18$\frac{1}{12}$ and 4$\frac{5}{14}$ as a recur-
ring decimal.

6. Compare the values of $\frac{1}{21}$ of £1, $\frac{1}{22}$ of one guinea, and $\frac{1}{4}$ of 3s. 9½d.

7. Find the value of 6413 articles at 4s. 10$\frac{7}{16}$d. each.

8. If 10 cannon firing 3 rounds in 5 minutes kill 270 men in an hour and a half, how many cannon firing 5 rounds in 6 minutes, will kill 500 men in an hour?

9 Find the simple interest and the amount of £106 13s. 4d. from June 15th to September 18th (both included) of same year at 4½ per cent.

XVII.

1. What is a concrete, and what an abstract number? Is a multiplicand or a multiplier necessarily one or the other?

   (a) What is a quotient? Under what circumstances is a quotient concrete number?

   (b) Explain what is meant by *carrying* in addition.

2. Reduce $2 + \dfrac{3}{1 + \dfrac{1}{5 + \frac{1}{4}}}$ to a simple decimal fraction,

   and $1.5 + \dfrac{2.6}{.3 + \dfrac{4}{.25}}$ to an equivalent vulgar fraction

   in its simplest form.

3. Divide the difference of $\frac{3}{4}\frac{7}{4}$ and ·70i by the sum of 2½ of $\frac{9}{11}$ and 2·4 of ⅘, and find what decimal of 3 the quotient is.

4. Find, by practice, the rent of 586 acres 1 rood 31 yards at £4. 1s. ·10½d. per acre.

5. The cost price of a book is 11s. 3d. : the cost of the sale 8 per cent., on this ; the profit 22 per cent.; find the retail price of the book.

6. Fifty coolies are employed for a day and receive at the end of the day, for the whole work they have done, Rs. 11-2-0, the men being paid at the rate of 4 annas, and the women at the rate of 3 annas a day. How many of them were women?

7. If a piece of work can be finished in 45 days by 35 men, and if the men drop off by 7 at the end of every 15 days, find in what time the work will be finished.

8. A gentleman sells a lakh of rupees out of the 4 per cents. at 16 discount and invests the proceeds when exchange is at 2s. 1d. in 3 per cent. consols at 96. What income does he derive therefrom?

XVIII.

1. Find the value of—

$$\frac{1}{2} \text{ of } \frac{3}{4} + \frac{7}{31} \text{ of } (1 + 1\frac{5}{6}) + 3\frac{1}{2} + 8\frac{3}{4} \text{ of } (1+\frac{1}{4}).$$

and

$$\frac{\frac{1}{2} + \frac{3}{4}}{\frac{1}{4} - \frac{3}{4}}$$
$$\frac{\frac{5}{6}}{1\frac{7}{2} \text{ of } \frac{3}{18}}.$$

2. Convert $\frac{37}{125}$ into decimals.

Find the value of ·16 of a guinea.

3. The rate of exchange for family remittances being 1s. 10½d. per Re. What must be paid here to remit £70 to England?

4. Extract the square root of 10246401.

5. If a servant receive £3. 10s. for 20 weeks' service, how many weeks ought he to remain in his place for 12 guineas?

6. A mass of metal is composed of fine gold 15 parts, of silver 4 parts, and of copper 3 parts. Find how much of each is required in making 18 cwt. of the composition.

7. If 8 men can dig a trench 100 feet long, 3 feet broad, and 4½ feet deep, in 9 days, how many men could dig a trench 80 feet long, 5 feet broad, and 2 feet deep, in 5¼ days?

8. To what sum will £725 amount in 3 years at 5 per cent. simple interest?

XIX.

1. If one lb. troy of gold be coined into $16\frac{2}{3}$ sovereigns, and standard gold contain $10\frac{1}{2}$ parts of pure gold to $1\frac{1}{2}$ of copper; find the weight of pure gold in one sovereign in grains. Also express the weight of copper in a sovereign as a decimal of one lb. avoirdupois.

2. Express the value of $\dfrac{133}{83\frac{1}{3}} = \left(1 + \dfrac{2}{3+\dfrac{4}{5+\frac{6}{7}}}\right)$ of a rupee

in decimals of £1, when the value of the rupee is $1s.\ 5\frac{1}{2}d$

3. A block of wood measures 2 feet 3 inches by 1 foot 3 inches by 1 foot $8\frac{1}{8}$ inches. Find the content by *cross multiplication*, and the value at 2 rupees $6\frac{3}{8}$ annas per cubic foot.

4. A person remits Rs 15,480 to England at the rate of $1s.\ 6d$ per rupee, and the money is invested in the purchase of 3 per cent. consols at $79\frac{1}{2}$. At what price should he sell out in order to realize a gain of £24 after having paid $\frac{1}{8}$ per cent. commission on each of the last two transactions?

XX.

1. Simplify the expression $\left\{ 2\frac{3}{4} + \frac{5}{8} \text{ of } \dfrac{7}{3\frac{1}{5}} - \dfrac{1\frac{3}{5}}{2\frac{1}{4}} \right\} \div 1\frac{7}{8}\frac{7}{9}$

2. Reduce to decimal $\dfrac{7\cdot75}{9}$ of $\dfrac{2\frac{1}{2}}{2\frac{3}{5}}$ of $\dfrac{20}{31}$

3. Find the product of $\cdot 0117117$ by $\cdot 333$　Also the quotient of $\cdot 12693$ by $19\cdot 39$.

4. Find the value of $\frac{3}{4}$ of £15 + $3\frac{3}{4}$ of £1 + $\frac{1}{2}$ of $\frac{4}{5}$ of $\frac{3}{4}$ of £1 + $\frac{3}{4}$ of $\frac{5}{9}$ of $1s.$

5. Find the value of $13\cdot 3375$ acres. Also find the difference between $\cdot 77777$ of £1 and $8s.$

6. Find (by practice) the value of 60 cwt. 3 qrs. 12 lbs. at £7. $13s.\ 6d.$ per cwt.

7   Find the expense of painting the walls and ceiling of a room whose height, length and breadth are 17 feet 6 inches, 35 feet 4 inches and 20 feet, respectively, at $7\frac{1}{2}d$. per square yard.

8.   A cistern is fed by a spout which can fill it in two hours, how long would it take to fill it if the cistern has a leak which would empty it in 10 hours?

9.   If 560 flagstones, each $1\frac{1}{2}$ feet square, will pave a court-yard, how many will be required for a yard twice the size, each flagstone being 14 inches by 9 inches?

10.   At what rate per cent. simple interest will £225 amount to £256 10s in 4 years?

XXI.

1   Write down troy and avoirdupois weights and length and surface measures. Write in figures, nine trillion four billion six hundred and forty million three hundred and sixty-five. Write in words, 5432176989007. Write in Roman numerals, 1877, 2001, 433 and a million.

2   Find the cube of 3976 and fourth power of 2579.

3.   Add together
£43. 7s. 2d.

4   The yearly expense of a village school was Rs. 300. This was paid partly by rent of $291\frac{3}{8}$ begahs of land at Rs. 3-8-0 per begah, partly by a tax on the village of Rs. 100, partly by Government allowance of Rs. 1-4-0 per scholar, and the rest was made up by the scholars, of whom there were 45, what did each pay?

5   If the rate of exchange is 1s. $8\frac{9}{16}d$ per rupee, what must be paid in India for a bill for £850 on England?

6   State in words the rules for multiplication and division of decimals. Multiply ·013 by 103, and divide ·01 by one million.

7.   Reduce ·02916 and ·30681 to vulgar fractions, and find their sum. Prove the rule for reducing a circulating decimal to a vulgar fraction.

8. Extract the square root of 12,595,401, and the cube root of 308915776.

9. If 8 compositors can set up six sheets in 10 days of nine hours each, how many men will set up a work of 8 sheets in sixteen days of 12 hours each?

10. Tea shares, original value R. 1,000 are selling at Rs. 1,250. They pay a dividend of 5 per cent. on original value; what income would Rs. 57,975 invested in them give?

XXII.

1. Find the value of $\left(2\frac{1}{4} + \dfrac{5}{3\frac{1}{3}} \text{ of } 3\frac{1}{2} - \dfrac{2\frac{1}{4}}{3\frac{1}{2}}\right) \div 1\frac{77}{2\,2\,8}$;

   and of $\frac{5}{1\frac{1}{4}}$ of $1\frac{1}{4}$ of £2. 16s. 3d. $\div \frac{4}{4\,9}$.

2. Reduce 5 yds. 1 ft. to the fraction of 1 mile; and $1\frac{1}{4}$ sq yds. to the fraction of 2 ft. 5 inchs.

3. Find the quotient of ·00044408 ÷ ·0112, and reduce to decimals.—

$$\frac{\cdot 7\frac{1}{4}}{9} \text{ of } \frac{2\frac{1}{2}}{2\frac{1}{7}} \text{ of } \frac{20}{31}\cdot$$

4 Find the value of 25·213 ÷ ·406 ; and of (·36 ÷ 1·78) × ·93 ÷ ·072.

5. Reduce 5℔s. 10 oz. 3 dwt. 15gr. troy to the decimal of a cwt. Avoirdupois; and find the value of ·00243 of a ℔ troy.

6. Find (by practice) the value of 17 cwt. 1 qr. 12 ℔ at £1. 19s. 8d. per cent.; also the tax on 500 guineas at 7d. in the £1.

7. (a) If the pound weight of silver be coined into 66 shillings ; what is the avoirdupois weight of half a crown?

   (b) If 4 men or 6 women can do a piece of work in 20 days; how long will 3 men and 5 women take to finish it?

8. If $\frac{1}{3}$ of a sheep be worth £$\frac{2}{3}$, and $\frac{3}{4}$ of a sheep be worth $\frac{1}{1\frac{1}{4}}$ of an ox ; how much must be given for 100 oxen?

9. In what time, at simple interest, will a given sum treble itself at $4\frac{1}{4}$ per cent.? Find the compound interest of £690 in 3 years at $4\frac{1}{4}$ per cent.

10. Find the square root of 36·00000625, and the sixth root of 533441.

XXIII.

1 Find the value of

$$\cfrac{2}{3+\cfrac{\cdot4}{5+\frac{2}{9}}} \quad \text{and} \quad \left(\frac{2\cdot375}{6\cdot3} \quad \text{of} \quad -\frac{8\,8\overset{\bullet}{}}{\cdot0625}\right) \div \left(\frac{17.7\overset{\bullet}{}}{11.35}\overset{-}{} \text{ of } \tfrac{1}{4}\right).$$

2. What is the difference in income from investing £15,000 in the 5's at 110½, and in the 3½'s at 92⅞ ?

3. A railway train having travelled at ⅔ of its proper speed reaches its journey's end 2½ hours behind time; in what time should the journey have been done ?

4. If F, G, and H, start together from one point to travel in the same circular path, 56⅓ miles in length; and their respective rates at 3⅓, 9½, 12 1⁄12 miles an hour; when will they be together again ?

5 If 12 of A count for 13 of B, 6 of B for 18 of C, and 13 of C for 20 of D, how many of A count for 100 of D ?

6 What is the present worth of £324 16s. 7½d. due 2¼ years hence, at 3½ per cent ?

7 If 27 men can do a piece of work in 14 days, working 10 hrs. a day, how many hours must 24 boys work in order to finish the same in 45 days, a boy's work being half a man's ?

8. A clock was 10 minutes slow 25 days ago, and to-day at the same hour is 10 minutes fast; when will it again show true time ?

9. If 7 gallons of brandy cost as much as 9 gallons of rum, and 9 gallons of rum as much as 12 gallons of gin, and the cost of 3 gallons of these, take one of each kind, was £2. 2s. 6d., what was the value of each per gallon ?

10 Find the fourth root of ·0103, to three places of decimals.

XXIV.

1. Write out neatly on one sheet of paper—Avoirdupois weight, measure of length and square measure.

10

2. Multiply 758 to the fourth power, and divide the result 963'7, to one place of decimals.

3. Divide £2. 9s. 4½d. between 27 men 31 women and 15 children, so that each man shall have three times and each woman twice as much as each child. Show what each person gets and what each class gets.

4. Multiply ·039 by ·0039, and divide the product by 39,000.

5. Find the square root of 2·2099401.

6. A cistern can be filled by two taps in 20 and 24 minutes, respectively, when in good order, but after they have both been running together 15 minutes it is found the cistern is only ¾ full. Determine the rate of leakage.

7. Explain the system of notation in common use, and express 98798 in a system consisting only of the first 6 figures and the cypher of the present system. Also express 1234560 of this new system in the present   What is the advantage of the decimal system, and would any other number of digits be equally convenient?

XXV.

1 Find the Greatest Common Measure of 42237 and 75582; and the Least Common Multiple of 54, 81, 63, 14. Reduce to its lowest terms $\frac{2317\frac{1}{2}}{6417\frac{1}{6}}$.

2. Simplify $\frac{2\frac{1}{2}}{3\frac{1}{4}}$ + $\frac{1\frac{1}{2}-\frac{5}{6}}{1\frac{1}{4}+\frac{5}{8}}$ — $1\frac{3}{5}$; and, $3\frac{2}{5}$ of $5\frac{1}{2}$ of $\frac{7}{8}$ — $\frac{1}{8}$ of $\frac{5}{12}$.

3 Reduce to decimals

   $3\frac{4}{25}$ + $\frac{88}{110}$ + $81\frac{37}{1000}$ + $\frac{7\frac{1}{2}}{3\frac{1}{4}}$; multiply $3\cdot1\dot{4}\dot{5}$ by $\cdot4\dot{2}9\dot{7}$.

4. Divide $41\dot{1}\cdot\dot{3}51\dot{9}$ by $5\dot{8}\cdot7\dot{6}4\dot{5}$.

   Reduce $\cdot129\dot{3}13\dot{1}$ to its equivalent vulgar fraction.

5. Find the value, in cubic feet and inches, of $\frac{9}{11}$ cubic yards+ $2\frac{1}{4}$ cubic feet; also find the value of $3\cdot24\dot{2}$ of $2\frac{1}{4}$ acres.

6. Find by practice the value of 39 cwt. 10 lbs. at £3. 15s. 7¾d. per cwt.

7. A man buys wine at 4 shillings a gallon; he mixes it with water, and by selling the mixture at 3 shillings a gallon gains 20 per cent. on his outlay. How much water did each gallon of the mixture contain?

8. 124 men dig a trench 110 yards long 3 feet wide and 4 feet deep, in 5 days of 11 hours each; another trench is dug by half the number of men in 7 days of 9 hours each, how many cubic feet of water is the latter capable of holding?

9. At what rate per cent. simple interest will £225 amount to £256. 10s. 0d. in 4 years?

XXVI.

1. Find the value of $\dfrac{3(1\frac{1}{3} + 2\frac{1}{4})}{\frac{1}{2}\left(\dfrac{5\frac{1}{8} - 3\frac{3}{8}}{2\frac{1}{4} + 1\frac{1}{8}}\right)} \div \dfrac{4(3\frac{5}{12} - 2\frac{7}{10})}{2(1\frac{1}{4} + 2\frac{1}{8})} \times \frac{3}{5}$;

also reduce to a vulgar fraction $\dfrac{3\dot{3} + 6\cdot24}{2\dot{4} - 24} \times \dfrac{6\cdot02 - 3\cdot01}{1\cdot2\dot3 + 1\cdot1}$.

2. At what rate per cent. will a sum of money double itself in 6½ years, simple interest?

3. A planter by selling indigo at Rs. 200 per maund loses 3 per cent. What will be his loss or gain per cent. when he sells at Rs. 210-8-0, and what is the prime cost per maund?

4. Find the fourth root of 1,336,336.

5. A, being asked the hour of the day, replies that the time to noon is ⅘ of the time past midnight. What time is it?

6. What sum of money invested in the 4 per cents. at par would realise the same income as Rs. 10,000 invested in the 4½ per cents. at 102?

7. Exchange on London is at the rate of 1s. 7d. on demand, and 1s. 7½d. at 60 days' sight. What is the rate per cent. per annum for money in the latter case?

8. If 2 horses cost as much as 11 bullocks, 3 bullocks as much as 7 sheep, and 14 sheep as much as 15 goats. Find the cost of a pair of horses, the price of a goat being Rs. 5.

9. A, B, and C can together do a piece of work in 12 days · A
    can d it in 28 days, and B in 36 days. All three work
    together for 7 days when A leaves off work. In how many
    days will B and C complete the work?

10. A bullock-cart travelling at the rate of $2\frac{1}{2}$ miles per hour
    leaves Dehra for Saharanpur at noon, and four hours later
    the mail-cart, which travels at the rate of 8 miles per hour,
    starts in the same direction At what hour and at what
    distance from Dehra will the latter vehicle overtake the
    former ?

XXVII.

Write out the Arithmetical tables of Avoirdupois and Troy
weights, also that of Capacity.

2. Find the value of $\dfrac{5\frac{5}{8} \div \frac{3}{4}}{1\frac{1}{6} \text{ of } \frac{2}{3} + 10\frac{1}{2}} \times \frac{3}{8} \text{ of } \dfrac{1\frac{1}{2} \text{ of } 4\frac{1}{7}}{13\frac{1}{8} \text{ of } 5\frac{1}{4}}$;

and reduce $-\dfrac{2\cdot8 \text{ of } 2\cdot27}{1\cdot136} - + \dfrac{4\cdot4 \quad 2\cdot83}{1\cdot6 + 2\cdot629} \text{ of } \dfrac{6\cdot8 \text{ of } 3}{2\cdot25}$.

to a simple quantity.

3. Find the amount of £1485 in 3 years at 4 per cent. compound
    interest, neglecting fractions of a penney.

4. If a piece of work can be finished in 45 days by 35 men work-
    ing continuously, and if the men drop off by 35 at the end
    of every 15 days ; find in what time the work will be
    finished.

5   A person has £1,000 in the $3\frac{1}{2}$ per cents. how much must he
    have in the 3 per cents. that his whole income may be
    £200, and what sum would he realise by selling out at
    $83\frac{3}{8}$ and $77\frac{1}{4}$ respectively ?

6. Find the length of the edge of a cube which contains 3,605
    cubic feet, 64 cubic inches.

7. A can do $\frac{1}{4}$ of a piece of work in $\frac{2}{3}$ of the time that it would
    take B to do $\frac{3}{8}$ of it and B can do $\frac{1}{5}$ of the same work in $\frac{1}{4}$
    the time C would occupy in doing another piece of work
    half as large again as the first. If C can finish the first
    named piece of work in 6 hours, how long would A and B
    together be in doing it ?

MATRICULATION EXAMINATION PAPERS

ARITHMETIC.

I.

1 A bankrupt's estate amounts to £910 3s. 1½d , and his debts to £1875   What can he pay in the pound? and what will a creditor lose on a debt of £57 ?

2. Add together $\frac{3}{12}$, 1⅜, $\frac{1\frac{1}{2}}{8}$, and $\frac{1\frac{3}{4}}{1\frac{5}{8}}$; and subtract the result from 4¼.

Find the value of $\dfrac{\cdot003 \times \cdot001}{\cdot006}$ and of $\dfrac{10724}{\cdot003125}$.

3   Find the square root of ·05368489.

Find the value of $\sqrt{\dfrac{3}{3-1}}$ to four places of decimals.

4 A person having invested a sum of money in the 3 per cent consols, receives annually therefrom £233, after deducting the income tax of 7d. in the pound.   What is the sum of money ?   What can the stock be sold for when consols are at 94¼ ?

II.

1. Reduce the expressions :—

$\frac{3}{20} + \frac{6}{12} + \frac{4}{15} - \frac{5}{6}$, and $\left\{\dfrac{\frac{1}{4}+\frac{1}{3}}{\frac{1}{4}-\frac{1}{3}} + \dfrac{\frac{1}{3}+\frac{1}{4}}{\frac{1}{3}-\frac{1}{4}}\right\}\frac{3}{4}$.

Multiply $49\frac{15}{16}$ by $50\frac{1}{16}$ and add $\frac{1}{256}$, to the result.

Divide $\left(2\frac{1}{15}\right)^3 - 1$ by $\left(2\frac{1}{15}\right)^2 + .3\frac{1}{15}$.

2. Divide ·28413 by ·0231.

Extract the square root of 1095·61 and find to three places of decimals the value of $-\frac{4}{\sqrt{5}-1}$.

What fraction of a crown is $\frac{2}{3}$ of 6s. 8d? What is the value of $\frac{2}{7}$ of a guinea? Reduce $11\frac{3}{4}d$. to a decimal of a pound, correct to 5 places of decimal.

3. A person bought into the three per cents. at 98, and after receiving three years' interest he sold at 90. How much per cent. on the sum invested did he gain or lose?

4. Three gardeners working all day can plant a field in 10 days; but one of them having other employment can only work half the time. How long will it take them to complete the work?

OXFORD UNIVERSITY

EXAMINATION PAPERS.

ARITHMETIC.

I.

1. Multiply 1·00025 by 2400; divide 3075 by ·125; and find the value of ·1590 × ·472 ÷ 2·7.

2. Reduce $\frac{3}{5}$ of 4oz. 19 dwts. to the decimal of $2\frac{3}{5}$ of 16 dwts. 21 grns.

3. If the interest on 125*l.* for 3 years be 13*l.* 2*s.* 6*d.* what will be the interest on 200*l.* for 5 years at the same rate (simple interest)?

4. What is the rent at 1*l.* 13*s.* per acre, of a rectangular field of which the length is 1 fur. 20 po. and the breadth 10 po. 1 yd.?

5. A person rides a distance of 78 miles in 13 hours; how long would it take him, travelling at the same rate, to accomplish a journey of 60 miles?

II.

1. Simplify $\frac{3}{4} \times \frac{1-\frac{2}{3}}{2} + \frac{1}{2} \times \frac{2}{10} + \frac{3}{8}(\frac{1}{2}+1\frac{1}{4}) + \frac{3}{7}(\frac{3}{7}+\frac{4}{5})$

2. Reduce $\frac{3}{4}$ of 5*l.* 19*s.* to the decimal of 3*l.* 12*s.* 11*d.*

3. Divide 6·82 by ·0125. Reduce $\frac{159}{528}$ to a recurring decimal and express $\dfrac{2·8 \times 11\dot{\cdot}36}{5\dot{\cdot}681}$ as a vulgar fraction.

4. The business of a company produces 24299*l.* 14*s.* 5*d.*; of this amount 14487*l.* 16*s.* 11*d.* goes for working expenses. The remainder is equally divided among hundred shareholders, how much does each get?

5. A debt of 3*l.* 17*s.* 6*d.* is paid in farthings; how many will be required? And what will be their aggregate weight if 8 farthings weigh 1 oz?

6. Find the present value of 324*l.* 6*s.* 1¾*d.* due 2 years and 9 months hence, at 3½ per cent. per annum.

7. Divide 954*l.* 9*s.* between A, B and C, so that A's share may be to B's share :: 3 : 5, and B's share : C's share :: 10 : 11.

8. A refiner buys sugar at the rate of 25*l.* a ton. The cost of refining is 1*l.* 1*s.* 8*d.* per cwt. He sells the refined sugar at the rate of 5½*d.* a pound. How much per cent. does he gain?

III.

1. Subtract ⅔ of 38*l.* 12*s.* 6*d.* from ⅘ of 47*l.* 16*s.* 3*d.*, and reduce the remainder to the fraction of 100*l.*

2. Simplify $\dfrac{\cdot064 + 12\cdot25}{\cdot9375.}$.

3. Find the value of 23 tons 6 cwt. 2 qrs. 14lbs. of metal at 3*l.* 13*s.* 4*d.* per ton.

4. The cost of keeping 25 horses being at the rate of 11*l.* 6*s.* 0½*d.* per week, what will be the cost of keeping 13 horses from Sept. 1 to Oct. 31?

5. If a person sells £1000 three per cents. stock at 91, and invests the proceeds at 5 per cent., by how much is his income increased?

6. Ten tons of goods bought at 27*s.* 6*d.* per cwt. are sold at 30*l.* per ton. What is the whole gain, and the gain per cent?

IV.

1. A merchant sells tea to a tradesman at a profit of 60 per cent.; but the tradesman becoming a bankrupt pays only

2s. 6d. in the pound. How much per cent. does the merchant gain or lose by his sale?

2. Multiply $99\frac{3}{3}\frac{7}{1}\frac{9}{3}$ by $1\frac{3}{4}$ and find the nearest integer to the product.

Show that $\frac{1}{2000}$ of £10. 16s. 8d. is equal to ·002 of £2. 1s. 8d.

Simplify $\quad \dfrac{3+\frac{5}{3}\text{ of }\dfrac{21}{7\frac{1}{2}} - \frac{1}{4} - \dfrac{1\frac{3}{4}}{2\frac{1}{4}}}{10 - \frac{101}{225}\text{ of }5}$.

3. Find the square root of ·006084. Divide ·03 by ·0000375 and find the value of ·53125 of £1.

4. Find the sum which must be invested in the 3 per cents. at 90, at simple interest payable half yearly to amount in $23\frac{1}{2}$ years to £2317 money, the price of the funds remaining unchanged. If the funds rose to 96, in how many years sooner could the required amount be realized?

V.

1. Simplify

    (1) $17\frac{1}{2} + 16\frac{5}{8} + 9\frac{1}{3}$.

    (2) $2·34 \times 1·025 \div ·0009$.

2 What difference is there between the values

    (1) of $\dfrac{2\frac{1}{9}\text{ of }5\frac{1}{3}}{27\frac{1}{2}}$ of 1l. 2s. 6d. and $\dfrac{5\frac{1}{12}}{2\frac{1}{4}+3\frac{3}{4}}$ of 12s. 6d.

    (2) of ·856 of 2 cwt. 26 lbs. and 3·227 of 2 qrs. 10 lbs.?

3. Find the cost of carpeting a room 34 ft. 9 in. long by 26 ft. 6 in. wide at 4 s. 6 d. per square yard.

4. What interest will 2294l. 18s. 9d. produce in 2 years 115 days at 5 per cent. per annum simple interest?

5 If, when meat is at 9d. per lb., it costs 11l. 16s. 3d. to supply a family of 12 persons for 5 weeks, much will it cost to supply a family of 18 persons for 7 weeks, when meat is at 1s. per lb?

VI.

1. Divide ·02⁵ by 500, and ·22500 by ·00015.

2. Simplify

$$\tfrac{3}{4}\left(\frac{4\tfrac{1}{5}\text{ of }6\tfrac{3}{4}}{7\tfrac{2}{3}\tfrac{3}{7}}\right)\times \frac{3\tfrac{3}{7}-3\tfrac{1}{2}}{3\tfrac{1}{7}+2\tfrac{1}{8}}\text{ of }182l.\ 7s.\ 5d.$$

3. Find what 222l. 12s. 11d. will amount to in 7000 days at 2 shillings per cent. per week simple interest.

4. What will it cost to paper a room 21 ft. 5 in. long, 18 ft. 7 in. broad, and 10 ft. high, with paper 25 in. broad, which costs seven pence a foot?

5. If 6 men can do a piece of work in 30 days of 9 hours each how many men will it take to do 10 times the amount, if they work 25 days of 8 hours each?

6. Reduce 5 cwt. 1 qr. 13 lbs. 9 oz. to the decimal of a ton.

VII.

1. Simplify $\tfrac{4}{7}+\frac{7\tfrac{3}{4}-6\tfrac{1}{2}}{2\tfrac{1}{4}\times 9}$; and divide 33 yds. 10 ft. 8 in. by 13¼.

2. Divide ·0096 by 1·2; and express 7s. 2d. as the decimal of 3l. 15s. 9d.

3. If a family of 7 persons can live on 140l. for 18 weeks, how long can a family of 9 persons live on 135l.?

4. Find the simple interest upon 41l. 13s. 4d. for 8 months at 4½ per cent. per annum.

VIII.

1. Find by Practice the value of 1 qr. 2 bush. 2 pecks at 29l. 16s. 6d. a bushel.

2. Express in their simplest forms :—

(1) $\dfrac{1892}{1936}$,   (2) $3\tfrac{1}{3}+\left\{\dfrac{1-1\tfrac{5}{6}}{\tfrac{1}{2}-\tfrac{1}{4}}\right\}$.

3. Add together $\tfrac{7}{15}$ of 5l., $\tfrac{4}{7}$ of 9l. 13s. 2¼d., and $\tfrac{1}{13}$ of 2s. 6d.

4. Divide 1215013·8 by 2·023 and ·000072072 by ·000012.

5. Reduce 4 oz. 7 dwts 12 grs to the fraction of 5 oz. Troy and 14s. 7½d. to the decimal of 5l.

6. Find the fraction corresponding to 1·01 and divide 27·36 by 3·109

7. If a cubic foot of marble weigh 2·716 times as much as a cubic foot of water, find the weight of a block of marble 9ft. 6in. long, 2 ft. 3 in. broad, and 2 ft. thick, supposing a cubic foot of water to weigh 1,000 ounces.

8. It is found that 1296 bricks (the exposed surface of each brick measuring (9½in. by 4½ in.) have been employed in paving a certain court-yard: how many tiles, 6in. square, would be required for a pavement one-ninth of the size?

9. Which is the better stock for investment, the 3¼ per cents. at 92⅜ or the 3½ per cents. at par?

IX.

1 Write out the table of Square Measure, and reduce 3 roods 5 poles 23 yards 6 feet 108 inches to yards.

2. How many pounds Troy are equal to 144 lbs. Avoirdupois?

If the difference between the numbers which express the weight of a load in Troy and Avoirdupois pounds is 31, what is the weight of the load in grains?

3. Find the cost of 14 yards 4 qrs. 1 nail of Genoa velvet at 27s. 4 d. per yard.

4. Simplify :—

(i) $\dfrac{4\frac{1}{9}}{\frac{7}{16} \text{ of } 3\frac{1}{2}} - \left(\frac{1}{7} \text{ of } \dfrac{2\frac{3}{4} + 1\frac{1}{8}}{2 - \frac{4}{35}}\right).$

(ii) $\dfrac{22·4}{·25} + \dfrac{250}{·8} + \dfrac{1·2}{·0075}.$

5. Find the difference between $3\frac{1}{37}$ of 2 qrs. 25 lbs. and ·25 of 4 cwt. 3 qrs. 20 lbs.

6. Reduce 2¼ of 5l. 11s. to the fraction of $2\frac{5}{16}$ of 4 l. 5s.

7. Find the square roots of $39\frac{1}{16}$ and ·00255025.

8. A block of marble which when squared measures 29ft. 6in. in length, 12ft. 6in. in width, and 10ft. in depth, is valued at 407*l*. 3*s*. $2\frac{3}{4}d$. At what rate is that per cubic foot?

9. What is the true discount upon 75*l*. 0*s*. $1\frac{1}{4}d$. for 25 days, at $7\frac{1}{2}$ per cent. per annum?

10. Six coins of equal weight, made of gold and silver mixed. are melted together and re-cast. In one of them the gold and silver are in the ratio of 2:1 ; in two others of 3:5, and in the rest 7:5. In what ratio will the gold and silver be mixed in the new coins?

11. On the occasion of the thanksgiving for the Prince of Wales it was estimated that the length of the route was seven miles, that there were on an average twenty rows of people on each side, and that each person presented a front of fifteen inches. On this calculation, what was the number of spectators?

X.

1. Find the greatest number of which 33495, 106260 are multiples, and the least number of which 26, 33, 39, 44 are divisors.

2. What fraction is that from which if $\frac{3}{4}$ of $\dfrac{3-1\frac{1}{2}}{2\frac{1}{4}}$ be subtracted and the remainder be divided by $-\dfrac{5\frac{1}{4}}{16\frac{1}{4}}$ the result will be $\frac{1}{4}$?

3. The area of a rectangular enclosure being 33sq. poles 1yd. 6ft. 108 in., and the length 9 poles 1ft. 6in., what is the width?

4. Divide (1) ·2 by $3\frac{1}{4}$. (2) $124\frac{1}{2}$ by ·415, (3) 1·05 by ·126.

5. Prove that ·3 of 1*l*.+·4 of 3*s*. $7\frac{3}{4}d$. +·5 of 1*d*. is equal to ·6 of 11*s*. 3*d*.

6. If 10oz. 13dwt. 16grns. of gold, worth 3*l*. 5*s*. per oz., be mixed with 1oz. 2dwts. 8grns. of silver, worth 5*s*. per oz.

how much worthless alloy must be added to reduce the value of the compound metal to 2*l*. 16*s*. 8*d*. per oz. ?

7. The price of coal being raised 50 per cent. by how much per cent. must a house-holder reduce his consumption of that article so as not to increase his expenditure.

8. If 15 men earn 68*l*. 12*s*. 6*d*. in 25 days, in how many days will 20 men earn 35*l*. ?

9. What is the present value of an annuity of 885*l*. 10*s*. for 3 years, the first payment due 1 year hence, interest 5 per cent. per annum ?

10. A person invests 25935*l*. in three per cent. stock at 90. What is his income? and, if the first year's dividend be invested in the same stock at 91, and the whole dividend for the second year at 95, what will the income for the third year amount to ?

XI.

1. Simplify—

$$2 \times \frac{\frac{38}{28} - 1\frac{19}{45}}{131 - \frac{943}{7\frac{1}{5}}} - 1\frac{5}{207} \text{ of } 5\frac{11}{13} \text{ of } 10\frac{7}{20} \text{ of } \frac{5}{10} \text{ of } \frac{1}{10}.$$

2. Find the G. C. M. of 169037 and 66429; and the L. C. M. of 44, 48, 52, 96.

3. Divide 7·73682 by 101·4, and reduce 0·363 of 2*l*. 1*s* 3*d*. to the decimal of 0·72 of 3*l*. 6*s*.

4. A cistern, without a lid, whose floor and walls are an inch and a half thick is 5ft. 3in. long, 3ft. 7in. wide, and 2ft. 5½in. high in its external dimensions. Find its internal surface, and the cost of painting the same at 4*d*. per square foot.

5. Find the square roots of 1522756 and 9$\frac{97}{121}$.

6. Find the present value of 91*l*. 17*s*. 6*d*. due in two years at 5 per cent. compound interest.

7. If the cost of printing a book of 320 leaves, with 21 lines on each page and on an average 11 words in each line, be 19*l*., find that of printing a book with 297 leaves, 28 lines on each page, and 10 words in each line.

8   How should I affect my income by selling out from the $1\frac{3}{4}$ per cents. at $47\frac{1}{4}$ and investing in the $3\frac{3}{4}$ per. cents. at 99 ?

XII.

1. Find the G. C. M. of 5568981 and 506382; and the L. C. M of 32, 48, 40, 14.

2   Simplify $\dfrac{1\frac{3}{4} \text{ of } 1\frac{1}{4}}{3\frac{3}{5} + \dfrac{5}{1\frac{1}{4}\frac{2}{1}}} + \dfrac{4}{5 + \dfrac{6}{7 + \frac{3}{8}}}$

3   Give a rule for the division of decimals, and divide 12·5 by ·0025, and 4·26 by ·73, expressing the latter result as a decimal.

4. Find what length of paper 14 inches wide will cover the walls of a room 15 feet long, 13 feet broad and 10 feet high ; and find the cost if the paper is sold at three-halfpence a foot.

5. Find the square roots of 11854249 and $1\overset{.}{7}$.

6. A merchant buys a fifty gallon cask of wine for 62l. 10s., and sells it at 26s. per gallon ; what is his gain per cent.?

7   If the wages of 4 men for 12 days be 6l., what would be the wages of 6 men for 10 days ?

8. How much $3\frac{1}{2}$ per cent. stock at $97\frac{3}{4}$ can be purchased for 351l., and what income would be thence derived ?

CAMBRIDGE UNIVERSITY

EXAMINATION·PAPERS.

ARITHMETIC. ·

I. ·

1 Add together $\frac{2}{5}$, $\frac{35}{40}$, $\frac{14}{100}$, $\frac{13}{10}$, and $\frac{2}{2500}$, and reduce the result to its lowest terms.

2 Reduce 14 weeks, 6 days, 23 hrs., 45 min, 20 secs., to the fraction of a year consisting of $365\frac{1}{4}$ days.

3. Multiply 3·12 by 2·0001. Divide ·01 by ·00001 and ·1872 by ·0312.

Find the value of ·75 of £52 6s. 8d.

4. An article which cost 7s. and another which cost 11s. are together sold for £1. 4s. 9d., what is the profit per cent. ?

5. If the discount on £226 2s. 8d. due at the end of a year and a half be £12 16s. what is the rate of interest ? .

6. A has stock in the 3 per cent. consols which produces him £300 per annum. He sells out one-half at 92, and invests the proceeds in the South Devon Railway when a £50 share is worth £23. What dividend per cent. per annum ought the South Devon Railway to pay so that he may increase his income by £50 per annum by the operation ?

II.

1. What is the value of $2654\frac{3}{4}$ cwt. of sugar. at £3. 15s. $9\frac{1}{2}d.$ the cwt. ?

Find the square root of 1863821584. .

2. Find the interest on £3156. 8s. for five months at 3¼ per cent. per annum.

3. Multiply ·315 by ·0315 and divide the result by ·013 to two places of decimals.

4. A sum of money amounting to £7816, free of legacy duty, was left by will to be divided equally amongst a certain number of legatees. The share proved to be £325. 13s. 4d. : what was the number of legatees ?

5. How much will be gained by investing £5000 in the 3 per cents. when at 86¼, and selling out when they are at 91¾ ? And what would be the difference of income before and after the operation if the money when not invested bore interest at 1½d. a day ?

6. A person buys a piece of land, at £30 an acre, and by selling it in allotments finds the value increased three-fold, so that he clears £150 and reserves 25 acres for himself ; how many acres were there ?

7. How much will be gained by selling out £4000 from the 3 per cents. when at 85¼, and investing when they are at 81¾ ? And what will be the difference of income before and after the operation ?

8 How many sheep must a person buy at £7 each, that after paying one shilling a score for folding them a night he may gain £79 16s. by selling them at £8 ?

9. If 10 men reap 4 acres of corn in 4 days, working 10 hours a day, how many men would be required to reap 21 acres in 12 days, working 12 hours a day, supposing that a reaper who works 10 hours a day does $\frac{1}{15}$th part more work in an hour than one who works 12 hours a day ?

III.

1. Find the value of 17 cwt. 3 qrs. 21lbs. at £1. 6s. 4d. per cwt.

2 What is the least number of dollars at 4s. 2d. each, which is equal to an exact number of sovereigns ?

3. Prove that the fraction $\dfrac{5+6}{6+7}$ is greater than $\frac{4}{5}$ and less than $\frac{5}{6}$.

Reduce $\dfrac{2\frac{1}{4}-\frac{5}{6}}{2\frac{1}{4}+\frac{5}{6}} + \frac{7}{12}$ of $\dfrac{9\times10}{14\times3} - \dfrac{22\frac{1}{2}}{30}$ to its simplest form.

5. A man contracts to perform a piece of work in 30 days, and immediately employs upon it 15 men; at the end of 24 days the work is only half done; required the additional number of men necessary to fulfil the contract.

6. Multiply ·025 by 10,000, and divide 10,000 by ·025.

7. Convert $\frac{2}{5}$ of a florin and $\frac{3}{10}$ of half a-crown into decimals of £5.

8. Extract the square root of the product of ·001 and 15·625 Of what number is 1 the square root?

9. A fixed rent of £780 per annum is converted into a corn-rent of one-half wheat at 48s. per quarter, and the other half barley at 30s. per quarter. What will be the rent when wheat has advanced to 56s. and barley to 32s. per quarter?

10. A person invested £4410 in 3 per cent. consols at 90. At the end of a year he sold out at 93½, and invested the proceeds in Russian 4½ per cent. Stock 98. What addition is thereby made to his income?

IV.

1. How many pounds of tea at 4s. 2d. per ℔ can be bought for £12. 10s?

2. If 14 men can do a piece of work in 18 days, in how many days will 24 men do it?

3. Add together $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{5}$, and subtract from the sum $1\frac{1}{4}$. What fraction of £58. 5s. 6d. is $\frac{3}{4}\frac{4}{9}$ of £17. 2s. 3d.?

4. The net rental of an estate, after deducting 7d. in the pound for income-tax and 5 per cent. on the remainder for the expense of collecting, is £479 ,11s. 10d., what is the gross rental?

5. Multiply 1·075 by ·0101, and divide the product by ·43

6   Add together 2·095 hours, ·07 days, and ·05 weeks, and express the sum as a decimal of 365·25 days.

7. A bankrupt has book-debts equal in amount to his liabilities, but on £3000 of them he can only recover 6s. 8d. in the pound, and the expenses of the bankruptcy are 5 per cent on the book-debts ; if he pays 11s. in the pound what is the amount of his liabilities ?

8. The distance between two stations A and B is 65 miles. A train starts from A to go to B at the rate of 15 miles an hour, and is delayed 10 minutes on the way; another train starts from A two hours after the former at the rate of 25 miles an hour, find the interval between their times of arrival at B.

ANSWERS.

Page 1.   I—(1858).

1. The first operation is absurd ; $33\frac{1}{4}$.   2 $\frac{8427}{50000}$.

3   1 7320508 ; ·547725.   4 $1\frac{159}{1461}$ oz.

Page 1.   II—(1859).

1. 11 mo 17d 5 hrs. 20ms.   2 Rs 6   3. $1\frac{1}{4}$, 0079.

4. $10\frac{13}{18}$ 5.   00064 ; ·009 , 100,000

Page 2.   III—(1860).

1 $3\times5\times2$, $3\times3\times5\times2\times2\times2$; 1   4.   2 107 vds.

3 The former ; ·2236...   4 $857\frac{1}{2}$ ac ; $\frac{61}{210}$.

5 £2400 15s 0$\frac{1}{4}d$. $1\frac{13}{18}q$.   6. 13 4273 poles.

7. £1350.

Page 2. IV—(1861).

1. Rs. 9963.   2   7564 ; ·70716.   3.   29 ; 2.

4 Rs. 5. 15$\frac{4}{8}$as.

Page 3.   V—(1862).

1. $\frac{27}{50}$; ·54   2. $\frac{7}{9000}$: 1s. 9d.   3. $4\frac{4}{133}$ as.

4. $25\frac{15}{42}$ min.

Page 3.   VI—(1863).

1. $7\frac{23}{533}$; 7·065671 ..   2. $3\frac{28871}{120400}$.   3. £143. 7s. $11\frac{13}{14}d$.

4. 14 $\frac{27}{38}$ days.   5.   31·052.   6. £529 4s 7$\frac{1}{4}d$. $\frac{7}{39}q$.

Page 3.   VII—(1864).

1.   540.   2. 1 ; 2.   3.   £77. 14s. $7\frac{1}{10}d$.   4. $4\frac{1}{4}d$. ; 5865416.

5.   ·014 ; ·0001.   6.   6800 . 7221.

Page 4.   VIII –(1865).

1. 79$\frac{213}{217}$; 79·4048 ; ·3415. 　　　　2. ·061764 ; 10.
3. 329 $\frac{1}{10}$yds.; Rs. 1,023 9as. 7$\frac{1}{4}$ pie　　4. 45 men.
5. Rs. 84 1an. 10 pie , Rs. 16, 8 as.

Page 4.   IX—(1866).

1. ·10444637 . ; 1.　　2. £21.3s. 6$\frac{1}{2}$d. $\frac{5}{7}$q.
3. ·00041616 ; 9·042 ; 21·7272 .. ·
4. 256·256 , ·0256256. 5. Rs. 210.　　6. 99$\frac{5}{13}$; £176 4s
　　2 $\frac{179}{221}$d.

Page 5.   X - (1867).

1　19 miles 836 yards 2 feet.　　2. 102960; 1 ; 320·873 .
3　His loss = £1. 3s. 4d.　　4. $\frac{6}{9}\frac{8}{7}$, 9$\frac{548}{575}$.
5. $\frac{81}{10000}$; ·001275 , $\frac{431}{288000}$; ·0016.
6. 9$\frac{4}{5}$.

Page 5   XI--(1868).

1. 8s. 9·84d. ; 4$\frac{8}{9}$.　　2. 12 375 ; 1 816.　　3　140 miles.
4. 401 : 544 ·　　5. £12 18s. 10$\frac{99}{74}$d.　　6　58yds 2ft 3in

Page 6.   XII—(1869).

1. 4 ; ·0239.　　　　　　　2. £10 10s. ; $\frac{16}{45}$.
3. ·02 ; ·0000002 ; ·1414 ; ·0044 .　　4. £14 7s. 11$\frac{5}{6}$d
5. 16 years.

Page 6.   XIII— (1870).

1. Rs. 15 11as. 10$\frac{2}{10}$ pie ; 8091 c. ft.
2. 998999 $\frac{399}{1000}\frac{7}{6}$; ·001353 ; 290 ; 2 5227.
3. 140$\frac{1}{2}$; 2.0025….　　　4. 10$\frac{2}{3}$ days.
5. The latter investment is better.
6. Rs. 2070 $\frac{30}{371}$.

Page 7.   XIV—(1871).

1. Rs. 2732 13as.

2. $\frac{5}{28}$ is the greatest and $\frac{3}{4}$ is the least; £7 0s. $3\frac{42}{96}d.$, 1

3. 001875 ; 67952 25 ; Rs. 68, 2 as. $3\frac{7}{3}$ pie ;   154.

4. 55 miles.   5. Rs. 3250.

Page 8.   XV— (1872).

1. Rs. 1,597 10as. 3 pie.   2. $\frac{2}{3}$; Rs. 15, 2 as. 4 pie , $2\frac{7}{8}$.

3. 5050 ; $\cdot0\dot{7}\dot{5}$; $\cdot6\dot{7}7\dot{5}$; 30·84·

4. Rs. 197, 11as $7\frac{3}{8}\frac{77}{10}$ pie·   5. Rs. 262, 8 as.

Page 8.   XVI —(1873)

1. $\frac{7}{4}$; Rs. 2569 7 as 7 pie ; Rs. 48.

2. ·0033 ; $\frac{1}{60}$.

3. Rs 20 11as. $2\frac{94}{84}$ pie.   4. 19 years.

5. 5as. $7\frac{4}{8}$ pie ; His loss = Rs. 5498, 7as.

Page 9.   XVII—(1874).

1. $\frac{39}{81}$; 1:161 ; 2776850 ; ·230769.

2. 63 days.

3. Quantity of wood = 5964 cubic inches, cubical contents = 27500 cubic inches.

4. 120000.

5. Rs. 66666 10 as. 8 pie ; Rs. 108.

Page 9.   XVIII—(1875).

1. 2 ; Rs. 50 ; ·2213·   2 $\frac{1}{23}$.   3.   Rs. 35 1 an. 4 pie

4. Rs. 10,540.   5. Rs· 58 2 as ; $3\frac{10}{54}$ per cent.

Page 10.   XIX—(1876·)

1. $1\frac{4}{10}\frac{94}{24}$; Rs. 13, 13 as. $6\frac{9}{10}$ pie ; ·4.

    $\frac{4}{4}$; 23·04484.   3. $12\frac{4}{8}$ yds. Re 1-12as.; £216 16s. $8\frac{4}{4}d$

4. 200 days.   5. $4\frac{1}{2}$.

Page 10. XX—(1877.)

1. $\frac{1}{2}$, £3 9s.   2. Rs. 9105 1 an. 6 pie.   3. £78 15s.
4. 125.   5. 39 days.   6. Rs. 3312; Rs. 219.

Page 11. XXI—(1878.)

1. 2062·649.   2. 1·000.   3. 3749. .
4. Rs 24-14as. $6\frac{147.0}{1.1000}$ pie.   5. ·0099454 ..   6. £513, 5s. 9d.

Page 11. XXII—(1879)

1. $456\ 654 = 4 \times 100 + 5 \times 10 + 6 + \frac{6}{10} + \frac{5}{100} + \frac{4}{1000}$
2. 104.   3. (a) 4.   (b) $1\frac{7}{70.5}$.   (c) $\frac{1071}{39600}$.
(d) ·001   4. $23\frac{7}{16}$ 5. 68 men.
6. £11 15s. $9\frac{21.44}{21.19}d$.   7. 18.

Page 13.

1861. 1. ·07 ; 8.
1862. 1. £1726 13s. 4d.
1863. 1. $29\frac{3.4.7}{2.2.8}$ days.   2. £720 ; £900.
1864. 1. 10 yds. $\frac{3}{4}$ft. $5\frac{13}{157}$ in.
1865. 1. £7 15s. $7\frac{6.6.1}{1.15.2}$.
1866. 1. Rs. 11220.
1867. £1239. 13s. $4\frac{8.9}{1.21}d$.
1868. · 1. Rs. 3840 ; Rs. $3792\frac{1}{2}\frac{4}{4}$.
1869. 1. Rs. $46\frac{2}{3}$.
1871. 1. £600.
1872. 1. 1·25 lbs.
1873. 1. £$4687\frac{1}{2}$.
1874. 10 ; 25 ; 50 ; 75.
1875. 1. 10ft.
1876. 1. $101\frac{9.7}{10.3}$.   2. Rs. $24\frac{2.9.2}{4.8.7}$.
1877. 1. Re. 1. 12 as.
1878. 1. £4500.   2. $17\frac{1}{2}$ per cent.
1879. 1. 9 gals.   2. 5 per cent.   3. ·268.

Page 16—I.

1. $36\frac{1}{4}\frac{1}{4}$lbs. Avoir.
2. (1) Rs. 1436, 1an. (2) 5s. 7·046$\frac{1}{4}d$.
3. ·54315. ; 128·67428....
4. 30·962 ..; ·00135.
5. 30 cub. yds. 17 cub. ft. $6\frac{3}{4}$ cub. in.
6. £1548. 16s. $9\frac{1}{4}\frac{1}{4}\frac{1}{4}d$.
7. 57 boys.

Page 16—II.

1. $\frac{2982}{8137}$.
2. Rs. 129, 14 as. $1\frac{1}{2}$ pie
3. ·000004 inches.
4. 20 $\frac{1089}{3101}$ hours.
5. The incomes are equal.

Page 17—III.

1. 321·5164.
2. $\frac{881}{10000}$, $\frac{78891}{100000}$.
3. 180 men.
4. $1\frac{3}{4}$, 1.6.

Page 17 IV.

1. $2\frac{1009}{21420}$, ·3591.
2. 109·17437.
3. 600600, 6·006, $1\frac{1}{60}$, 8·8.
4. 171 tiles.
5. Rs. 350.
6. £96. 1s. 8d.

Page 18—V.

1. 41·6, ·2213...
2. Rs. 1337-14-8.
3. Rs. 39· 12 as 3 pie.
4. Rs. 58906, 4 as.
5. Re 1 nearly.

Page 18—VI.

1. 10
2. ·00901, 14. 2200. 20
3. Rs. 105000.
4. 6213 $\frac{13}{44}$ miles.
5. Rs. 95197 $\frac{37}{275}$.
6. $20\frac{1}{2}$ ft. ; Rs. 42 11as 4 pie.

Page 19—VII.

1. $2\frac{13}{40}$, 6006000, ·0105.
2. 8 per cent.
3. Rs. 4140 1an, $5\frac{11}{44}$ pie.
4. £1000.
5. 7 : 3.

Page 19—VIII.

1. $\frac{1317}{3423}$; $\frac{131}{433}$.   2. Rs. 12015; Rs. 221-0-7$\frac{17}{121}$ pie.

3. 14742; 4178.   4. 6$\frac{9}{11}$ min. after the first opening

5. 1142$\frac{723}{1100}$ gallons.   6. Rs. 773-1 an. 3$\frac{9}{11}$ pie.

Page 20—IX.

2. 5d.$\frac{47}{18}$ q.   3. 3612924, 3572, 50824.

4 1344 lbs. saltpetre, 179$\frac{1}{5}$ sulpher, 268$\frac{4}{5}$ charcoal.

5 ·00297.   6 Rs. 264.

Page 21—X.

1. (1) 8 pie ; (2) 1 018 lbs   2. 6$\frac{1}{4}$; ·0505.

3. Rs. 428-12as.; 1 cwt.   4. 33$\frac{1}{3}$ per cent

5. Rs 3-4 annas   6. 24.

Page 21—XI.

1. Rs. 214-13 annas 6 pie , 156250; 00042361.

2. 29585.   3. 34$\frac{3}{4}$ cub in.

4. 5 days.   5. Rs. 52000. 6. 1500000.

Page 22—XII.

1. $\frac{8}{705}$; $\frac{16}{18}$; $\frac{423}{870}$.   2 8452 an l 70 96·17

3. 46 ft. 11.' 4″ 10″ ; 10 cub. ft 2 cub in

4 Rs 16500.   5. 1319·472 ft.

6. Rs. 3-2 annas.

Page 23—XIII.

1. $\frac{8}{9}$; Rs. 6, 5annas 10$\frac{3}{4}$ pie; $\frac{3}{4}$.

2. ·5388 ; ·3535 .. ; 1·1 ; 32 inches.

3. Rs. 67-8 annas.   4. Rs. 432.

5 Rs. 65028-6 annas 10$\frac{58}{200}$pie. 6. 10 annas 8 pie

Page 24.   I.—(1857.)

1. ·2. ·019.   3. 381.   4. 19·71.

5. 4$\frac{1}{2}$ ft.

6. £39 7s. 6d.

Page 25. II—(1858.)

1. Rs. 49-11 annas 11⅞ pie.
2. 5476000 oz. 1 day 23 hrs. 32 min. 5 secs.
3. ·23 mile nearly.   4. 57° 17′ 44″ near ly.
5. Rs. 774-0 anna 6⅘⅔ pie.   6. Rs. 25⅚⅔⅔ gain.

Page 25. I—(1859.)

1. 1358784.   2. Rs. 5491-11-1⅜⅔; Rs. 5175 1-9₁₂⁴.
4. ·006; 6·6; ·621.
5. 11960 yds. 4 ft. 20·41 in.
6. 79·7; 81·12; 74·6; 82 142.

Page 26. II—(1860.)

1. 56831327.   2. L. C. M. = 26292.
3. ·20045…   4. ₈₁₀₀⁴¹¹.
5. 34 004.   6. Rs. 1087-8 annas 1₄²₂³ pie.

Page 26. III—(1861.)

1. A's share = Rs. 22840. B's = Rs. 11420. C's = Rs. 3806⅔.
                                    D's = Rs. 7613⅓.
2. 1₃₀³⁸.   3. ₁₄₃₁¹¹⁰; 343.   4. 68·1553413.
5. Rs. 6714₃₇³⁹.   6. 1091495·4285.   7. ·065.
8. 26₁₀⁶ per cent.   9. Rs. 202-2 annas ⅔⅘ pie.

Page 27. IV—(1862.)

1. Fourteen thousand and six. Three thousand one hundred and seventy-nine millions forty thousand six hundred and one. Seventeen point cypher, four, six, one.
3. ₁₀₈¹.   4. 17.   5. £478 18s. 8⅝⅞d.
6. ·571428.   7. 8·04.   8. 9 days.   9. 20 miles.

12

Page 28.   V—(1863.)

1. 1962 rem. 123.

2. (1) £206 12s. 5½d. (2) Rs. 2066-3 annas 8 pie.

3. $\frac{4}{2}\frac{1}{1}\frac{0}{1}$; $8\frac{4}{4}\frac{9}{8}$; Rs. 3-14 annas.   4.   4·4137; 411·1.

5. £56 2s. 6d.   6.   357; 3·57; 141.

8. Rs. 358¾; Rs. 716¾.   9.   The steamer; 14 hrs.

Page 28.   VI—(1864.)

1. 9 hrs. 37$\frac{8}{11}$ min.   2. $\frac{1}{3}\frac{1}{5}\frac{2}{5}$ is the greater : diff. $= \frac{1}{7810}$,

3. 6 cwt. 0 qr. 2½ lbs. 9 6oz.   4.   1$\frac{1}{3}\frac{3}{3}$.

5. Rs. 14-9 annas 4 pie.   6.   4$\frac{1}{2}$; ·123.

7. £115 18s. 9d.   8.   3·8077.

            9.   25 miles.

Page 29.   VII—(1865.)

1. £22 4s. 10½d.   2.   Rs. 120.   3.   10 , 20.

4. 11ft. 6½in.   5.   2·3804.. ; ·0670.   6.   12$\frac{1}{2}$.

7. ·2803.   8.   Rs. 5,888.

Page 30.   VIII—(1866.)

1. Rs. 16,663-10 as. 8 pie.

2. 7 days 10 hrs. 52 min. 30 secs.

3. Rs. 241-0 anna 3 pie.   4. $\frac{8}{21}$.   5.   20.

6. (a) 14s. 1½d. ; (b) 10 as. 6 pie.

7. (a) 7·31 ; (b) $\frac{13}{30} = \cdot 4\dot{3}$.   8.   8 hrs.

Page 31.   IX—(1867.)

1. 3630000 oz.   2. Rs. 32·7 as.   3. $\frac{189}{1000}$; ·189.

   57.   5. $\frac{8}{15}$.   6.   14·003.

7. 25 per cent.   8. $\frac{3}{4}$.

9. The eldest son's share = Rs. 3184; the second son's = Rs. 2592 ;
   the youngest son's = Rs. 1728.

Page 31.   X—(1868.)

1. 90 men.   2. 64 yds. 1 ft. 4 in.   3. 5.   4. ·09091.
5. Rs. 3   6. · 32 days.   7. 60 stones.
                                           8. 25 chapters.

Page 32.   XI—(1869).

1. 1   2. £2428 15s.; £1238 13s. 3d.; £1190 1s 9d.
3. £900. 4   130 yds. 0·4 ft.   , 5. $16\frac{44}{121}$ ft.'
6. 6 hrs. 59 min. 15 secs.   7. Rs. 8-14 as, 1 pie.
8. $8\frac{3}{4}$.   9. $3\frac{13}{25}$ as.

Page 33   XII—(1870)

1. The latter; ·07083.   2. 1587·4909.   3. 660 ft. ; 495ft.
4. Rs. 15,000; Rs. 4,500. 5. Rs. 2790·10 as.; $\frac{893}{1152}$.
6. 6s. 8 0325d.   7. 1200,000 bricks; Rs. 5.
8. 36 $\frac{3}{4}$ miles per hour; 8·37 A. M.   9. 266·6.
                                           10. $8\frac{1}{2}$ days.

Page 34.   XIII—(1871.)

1. Rs. 5.   2. (a) 1. (b) $\frac{1}{3}$.   3. £290.   4: 6 pie.
5. £233. 17s. 10d. ; $5\frac{1}{3}d$.   6. 2 yrs.   7. 12 shillings.
8   4 sq. in.   9. $3\frac{1}{4}$ oz. 10. 22 miles.

Page 36.   XIV—(1873.)

1. 70 acres.   ·2. 1 ; ·25.   3. £1000; £4000.
4. 35 measures. 5. 18 miles.   6. Rs. 770 ; $\frac{10}{11}$.
7. £1000; 2 and $2\frac{1}{2}$ years.
8. Rs. 13680 ; each Rs. 621-13$\frac{1}{11}$ as.   9. 8 yds.; 3 hrs.
                                           10. 297 ft.; 231 ft.

Page 37.   XV—(1874.)

1. 39; 319.   2. 17*c*. 6*d*.   3. (*a*) 1. (*b*) ·125.
4. 9*s*. 7*d*.; ·01.   5. 80 seers.   6. £250; 4 per cent.
7. £690.   8. 277⅓ cub. in.   9. 2 : 1.   10. 2½ miles.

Page 38. XVI.—(1875.)

1. Rs. 441-7 as   2. ·87; 11344⅔.   3   51·3.
4. 10¼ days; 4⅞⅞ cub. ft.   5. Rs. 46-8 as·
6. 5×3×3×11×13×7×11×13×7; 5.
7. 15 ft.   8. £1606 11*s*. 1⅚⅞*d*.   9. 22 yds. 1 ft. ; 12
      10. 9 per cent.

Page 40. XVII—(1877.)

1. Rs. 603-13 as. 9 pie.   2. 13½
3. ·017; 35·062.   4. Rs. 17-1anna 8 pie.
5. 13 per cent.   6. Rs. 103-1anna 3 pie·
7. £49 16*s*.   8. Rs. 4,200.   9. 4⅞ measures

Page 41.   XVIII—(1878.)

1. (*a*) Rs. 1239-13 as. 4 pie. (*b*) Rs. 51738-3 as. 3 pie.
2. 52 days.   3. (*a*) ·00032; 3·2. (*b*) 8.
4. Rs. 9180.   5. Rs. 19½; Rs 1¼⅞.
6. Rs. 254-14 as. 3 pie; 28944 bricks.   7. 27 days.
8. ·0447; 27·6568·   9. 25.

Page 42.   I—(1866.)

2. 2 ac. 0 ro. 2 po. 4⅒ sq. yds.; 2⁸⁸⁹³⁄₁₁₁₄₀.
3. 1*s*. 11½*d*.

4. A's share = £50. B's = £100. C's = £300. D's = £1200.

5. £4600.   6.   7 hours ; 210, 84, 60, 42, 35, 30.

7. £200.   8.   ·536.

9. $12\frac{1}{2}$ days. 10.   12 per cent.

Page 43.   II—(1867.)

1. 20 hrs. 16 min.   2.   4 ac. 21 po. $12\frac{3}{4}$ sq. yds.

3. ·195   4. $33\frac{1}{2}$ lbs.   5.   5 per cent.

6. £89 8s. 9d.   7. $26\frac{4}{11}$ in.   8.   3s. $9\frac{5}{11}d.$; £1782.

                           9. $2\frac{2}{5850}$ min.

Page 45. III—(1868.)

1. ·125.   2. $\frac{192}{432}, \frac{160}{432}, \frac{192}{432}, \frac{204}{432}$; $\frac{17}{27}, \frac{4}{9}, \frac{7}{18}, \frac{5}{14}$.   3. $\frac{3}{43}$.

4. $277\frac{1709\frac{3}{4}}{65421}$ cub. in.   5. $4\frac{1}{2}$ p. c.   6.   ·797 ; ·884.

7. Rs. 4 8 as.   8.   Loss per cent. £7.

                         9.   18 shillings.

Page 45.   IV—(1869.)

1. $287466\frac{3}{4}$ cub. yds.   2. $\frac{3}{77}$.

3. Rs. 3,600. ; A's share = Rs. 2,400 ; B's = Rs. 900, C's = Rs. 240, D's = Rs. 60.

4. $8\frac{33}{145}$; $2\frac{349}{2100}$; ·142857.   5.   11 P. M.   6. $1\frac{7}{8}$ per cent.

7. 320.   8.   16 lbs.   9.   9600 yds.

                                10.   9·4 ft.

Page 46.   V—(1872-73.)

1. 8239 ; 1021.   2.   £8 5s. $1\frac{31}{32}d$.   3. $\frac{4}{11}$ min.

4. ·47023214. ; £820 16s. 8d.   5.   4s.

6. 2·5 francs.   7.   Re. 1.

8. 15 rich, 85 poor.
9. A's share = £32. B's = £16, C's = £24, D's = £28.
10. £30000.   11. 20 miles.

Page 47   VI—(1873.)

1. $3s.\ 0.0012d.$ 2. £2 $1\frac{1}{2}s.\ 9\frac{1}{4}d.$ 3. $1s.\ 10\frac{1}{4}d.$
4. $5:7.$ 5. $23,33,283\frac{1}{4}.$ 6. $7\frac{4}{15}$ miles.
7. 7 92.   8. 4-25 P. M.   9. ·0696889.
                                    10. 3·168.

Page 48. VII—(1874.)

1. $6d.$ 2. Rs. $629\frac{1}{23}$ as. ; Rc. 1, 15as. $0.\frac{3}{23}$ pie.
3. ·0001953125.   4. $1:4.$ 5. 17 ft. 4 in.
6. ·282842 miles.   7. £2686 $13s.\ 4d.$
9. 20 per cent.   10. Rs. 75. 7as. $6\frac{12}{25}$ pie.

Page 49. VIII—(1875.)

1. 1050 francs.   2. 43514 35074. lbs.
3. 15 ; $\frac{366}{1300}$ c. in.   4. £91 $7s.\ 7.5d.$ 5. £113$\frac{14420}{10241C0}$.
6. 6 yrs.   7. $\frac{6}{32}$ min.   8. 32 per cent.
9 £62 $10s.$ 10. Rs. 2,000.

Page 51.   IX—(1877.)

1. C passes.   2. Rs. 2.   3. 21.   4. 6 as
5. 72 men ; 288 women.   6. £108 $4s.\ 8d.$
7. £3.   8. £1650 ; £1540.   9. £1600
10. £2394.   11. £1350.

Page 52.   X—(1878.)

1. Rs. 951 5 as. 3 pie.   2. 1008 days.
4. 6 inches.   5. £33 ; £210.
6. Gold : Copper : : 146 : 93.   7. 200 c. ft.
8. 133 qrs.   9. 12 per cent.
10. 4 yrs.   11. £14700.

Page 54. I—(1862.)

1. $3x^6+4x^5+5x^4+2x^3+x^2+6x+7$;
   MDCCCCXVIII; MCCXXXI ; MCCLXII ; MDCCCLXII.

2. 256·268 ; ·00402803.   3. $33\frac{5071817}{6118766}$.

4. No. of Rs. 240.   Two-anna pieces 360.   Pice 960.

5. $2\frac{1}{10}$.   6. ·26₅   7. ·0891 ; ·2989...

8. Rs. 2163 15as. 8pie.   9. $93\frac{1}{15}$; $86\frac{22}{23}$.

10. $5\frac{35}{133}$.   11.   8·2265625.

Page 55. II—(1863.)

1. Four millions one hundred thousand and ten ; 7369.

2. Rs. 45 3 as. 4 pic.   3.   2s. 4d.

4. The annual payments due from each of the villages A. B,
   and C are Rs. 615, Rs. 410 from D.

5. 3 mo. 1d. 21 hrs. 14 min. 15 secs.

6. ·0246 ; ·940625.

7. 152·370 yds.   8.   Rs. 333 5ans. 4 pie.

9. £11 11s. $5\frac{49}{101}d$.   10.   Rs. 18.

Page 56. III—(1864.)

1. 37000000 ;   69000000 ;   494000000 ;   Nine hundreds of
   millions, three hundreds of thousand eight hundred and
   four—sixty thousand six hundred and sixty millions, six
   hundred eight thousand and eight.

2. G. C. M. = 3.   The nos. 3714 and 1815 have a common
   measure 3.

3. 135267874.   4. $\frac{215}{13112}$.

5. 4261·7415 ; 3888·8985 ; 759726·26738 ; 21·32...

6. Saltpetre 840 lbs., sulpher 112 lbs., charcoal 168 lbs.

7. 10·737. ..

8. A's share = Rs 3451 $\frac{17}{25}$, B's = Rs. 2876$\frac{2}{5}$, C's = Rs. 10462$\frac{23}{33}$.

9. Rs. 15495$\frac{44}{5}$.   10.   1584 lbs.

Page 57.   IV—(1865.)

1   One billion, two hundred and thirtyfour thousand, five hun-
dred and sixty-seven millions, six hundred and fifty-four
thousand three hundred and twenty-one.

Five billions, twenty thousand and forty millions, three
thousand and sixty.

2   Rs. 40457 11 as. 9 pie.   3.   Rs. 52.

4   405756 sq. ft., Rs. 12065 12as.   5. $5\frac{1}{10}$.

6   03 ; ·03225806 ; 03125.   7   Rs. 3, 7 as. 5 pie.

8.   A's share = Rs 22222 3as. $6\frac{3}{4}$ pie B's share = Rs 33333 5as.
4 pie. C's share = Rs. 44444 7as. $1\frac{1}{4}$ pie. D's share = Rs.
16153 $13\frac{17}{21}$as. E's share = Rs 30769 $3\frac{9}{13}$, as F's share
= Rs. 23076 $11\frac{12}{13}$ as.

9   34 shares, Rs. 12 left   10   53 hrs   11.   416·4 , 12·3

Page 58.   V—(1866.)

1   90009999 ; Eight' billions of units &c , Three nikharbas
&c., twenty thousand and ninety millions sixty thousand
and two

2   $1\frac{8}{9}$; (a) $\frac{1}{11}$.

3   Rs. 5000 (value of the whole mine), Rs 2000 (value of his
share).

5   ·1495535 71428

6   (i) 14·153157, (ii) 11·569328, (iii) ·499500. (iv) ·50000,
(v) 46·040.

8   Rs. 1636363$\frac{7}{11}$; Rs. 10000.   9   £515 16s. $7\frac{1}{2}d$

10   14 as. 3 pie.   11. $6\frac{7}{17}$ months

Page 59.　VI—(1867.)

2　2×2×5×3×3×7×43.

3.　$14\frac{31}{37}$.　4　·857142 ; $13\frac{472}{303}$.　5.　788·423.

6.　4 as $5\frac{1}{8}$ pie.　8.　90 men (nearly).

9.　3 years $8\frac{808}{1030}$ months.　10.　110 ; 90 , 30 , 10.

11.　78·006 ; ·015 ; 1·2. ..

12　Rs. 41 10 as. 8 pie ; 9 cwt. 2 qrs. $4\frac{4}{7}$ lbs.

Page 60.　VII—(1869.)

1.　G. C. M. = 97.　L. C. M. = 1008.　2.　1.

3.　2.　4.　$\frac{15627}{1000000}=\frac{1}{64}$; $\frac{1180475}{990099900}=\frac{1}{7}$,

5　·6489583.

6.　Rs. 393 13 as. ; Rs. 656 5as. 8 pie.; Rs. 1050 2as. 8 pie ;
　　Rs. 1181 7as.

7.　4 per cent.

8.　£1340 1s. 10·95375d.　9.　9 days.　10　£428.

11.　1769 ; 20·83.

Page 61.　VIII—(1870-71.)

1.　654323004021050321.
　　One billion three hundred and twenty-seven thousand eight
　　hundred and seventy-five millions, four hundred and
　　thirty thousand and twenty-nine.

2　$11\frac{513}{625}$; 11·8208.　3.　$\frac{23}{179}$; $\frac{625}{710}$.　4　£81.

5　Rs. 25600.　6.　See page 6. Ex. 4.

7.　$\frac{199}{623}$ oz. ; $\frac{3}{11}$ oz.　8.　£35 16s. 10·11d

9.　A's loss = Rs. 450 ; B's = Rs. 900. C's = Rs. 2250.

10　314642 ; 1·81659.　11.　$585\frac{5}{47}$

Page 62.　IX—(1871-72.)

1.　$191790\frac{193}{256}$ miles.　2.　1287 ; 372141.　3　$\frac{511}{1246}$.

4.　$\frac{5}{16}$; $\frac{9}{13}$; Rs. 4-9 as. $0\frac{3}{4}\frac{4}{7}$ pie.　5.　£806

6.　$4\frac{16}{21}$.　7.　$9\frac{13}{13}$; £2956 5s.

8.　83149 stamps nearly.　9.　$5\frac{130}{303}$.　10　1054 subscribers

Page 63.   X—(1873-74.)

1. $\frac{25400}{327405}$.   2. $\frac{37}{81}$.   3. $\frac{9}{50}$.

4. Rs. 1547 6 as: $2\frac{2280}{3007}$ pies.   b, $7\frac{1}{2}$ hours.

6. £2376 5s.   7. Rs. 30780.   8. 76.

9. $5\frac{7}{12}$.   10. 1234.

Page 64.   XI —(1874-75.)

1. 1.   2. 48.   3. $\frac{6}{7}$.

4. £72.   5. Rs. 14586.   6. 13s. 4d.

7   Rs. 26 per maund.

9. The fast trains travel 36 miles per hour. The slow train 24 miles per hour.

10. $\sqrt{50}$, $\sqrt[4]{2402}$, $\sqrt[3]{344}$.

Page 66.   XII—(1875-76.)

1. (a) Eight millions two hundred and seventy-one thousand and ninety-six.

   (b) Nine millions, thirty-two thousand, eight hundred and four.

   (c) Thirty-one thousand nine hundred and eighty millions, two hundred and fifty nine thousand four hundred and seventeen.

   (d) Eighty millions, four thousand six hundred and forty.

   2. 21 miles, 6 furlongs, 33 poles, 6 yards, 2 feet, 7 inches.

   4. 528093440 acres.   5. $1\frac{73}{132}$.

   6. $1\frac{34}{203}$, $1\frac{35}{203}$; &c.   7. 10·017 .....

8. Rs. 6792$\frac{24}{25}$.   9. 27 3 ; 32.

10. A's share = $3\frac{6}{25}s$., B's = $4\frac{6}{25}s$., C's = $5\frac{12}{25}s$., D's = $7\frac{11}{25}s$.

11. Rs. 18750 ; Rs. 56, 4as.   12. $3\frac{137}{288}$ sq. ft.

Page 67. XIII—(1877-78.)

2. B in advance of A $\frac{1}{24}$ mile.

3. $30\frac{8.3}{7\cdot 26}$.   4 Tea Rs. 2. 8as. Sugar 2as 8 pie.

5. $267\frac{1}{2}$ ft.; 243 times nearly.

6. A's share = Rs 850, B's = Rs. 846, C's = Rs. 1182.

7. £651. 0s. $11\frac{244}{403}d$. 8. £818. 8s. 9. ·0061.

10. $9\frac{70}{273}$ miles per hour.

Page 68. XIV—(1878-79.)

1. £90. 18s. $11\frac{1}{4}d$. 2. 1.

3. £4. 0s. $7\frac{311}{2200}d$. 4. 83 ft. 9 in. 5. 25 per cent.

6 Rs. 7908 2 as.; 10 as. 6 53 pie

7 £1500. 8. £215$\frac{95}{317}$. 9. £20.

10. £2890. 10s.

Page 70. I—(1862.)

1. £4000. 2. 5 lbs. 1 oz. 5 dwt.; 10661...

3 Rs. 4942$\frac{8}{41}$. 4. 11 oz.

Page 70. II—(1864.)

1 9956. 2. $\frac{121}{320}$; $4\frac{21}{110}$. 3. 97 7548

4. A's share = Rs. 18$\frac{88}{340}$; B's = Rs. 25$\frac{98}{340}$; C's = Rs. 55$\frac{55}{410}$
D's = Rs. 111$\frac{3}{4}\frac{15}{16}$.

Page 71. III—(1865.)

1. 16463 ; 4700. 2. 182$\frac{518}{551}$.

3 Rs. 3995. 11 as. 1$\frac{488}{500}$ pie.

4. £263. 7s. 6d. (taking 2 shillings for a rupee).

Page 71. IV—(1866.)

1. 133.

2. $\frac{769}{660}$; $\frac{551}{990}$.

3. 72 miles.

4. $53\frac{1}{3}$.

Page 72. V—(1870-71.)

2. 1; ·13312

3. ·2309; 1·8161; ·998607916.

4. Rs.122. 8 as. $6\frac{3}{2}$ pie.

5. Rs. 10538 12as. 6 pie.

Page 73. VI—(1871-72.)

1   $\frac{33}{21}$.

2. $1\frac{71}{115}$, $1\frac{1}{2}$.

3. $88\frac{8}{9}$. Rs. 13500.

4   Wife's share = Rs. 14508; Eldest son's = Rs. 12090. Younger son's = Rs. 12896; Daughter's = Rs 9672.

Page 73. VII—(1873-74)

1   $\frac{8}{5}$; $\frac{47}{194}$; $\frac{57}{181}$; $\frac{104}{33}$.

2. 41000; 63·099.

3. ·21875.

4. $12\frac{618}{1047}$ months.

5. Rs. 2,000; Rs. 21,000, Did t income = £60.

Page 74. VIII—(1874-75.)

1   $\frac{18}{15}$, £22. 4s $5\frac{1}{3}d$.

2. (a) 1. (b) $4\frac{1}{3}$.

3. 9s. $10\frac{52}{325}d$.

4. $4\frac{1}{7}$; $3\frac{3}{7}$.

Page 74. IX—(1875-76.)

1. $3\frac{1}{2}$; $\frac{97}{400}$.

2. $1\frac{1291}{13546}$.

3. ·8$\frac{9}{25}$s (1) Profit per cent.; $55\frac{25}{102}$.

4. $12\frac{1}{4}$ hours. A $4\frac{1}{4}$ acres; B $5\frac{1}{2}$ acres.

5. Rs. 1,000 loss.

Page 75. I—(1873.)

1. 1010001, 766. 3. (1) $6\frac{1}{2}$; (2) $\frac{9}{2}\frac{4}{6}\frac{3}{6}$.

4. 1ro. 14po.; ·72. 5. 999 ;· 1·772. 6. 15 pumps.

Page 76. II—(1874.)

1. 2881. 3. Rs. 800. 1an. 9 pie. 4. $22\frac{2}{7}$ seers.

5. Rs. 3,992. 11as. $8\frac{19}{32}\frac{11}{4}$ pie.

Page 76. III—(1876.)

1. 1s. $11\frac{1}{4}d$. 2. (a) 18 min. (b) $11\frac{13}{64}\frac{7}{3}$; 11·8208.

3. 307·96; 17·5.

4. (a) Rs. 4,838. 11as. $4\frac{8}{31}$ pie. (b) $531\frac{44}{17}$; Rs. 31. 14as. $7\frac{11}{17}$ pie.

Page 77. IV—(1878.)

1. Rs. 5. 10 as. 2 pie. 2. $1\frac{5}{13}$; ·1977 .....

3. (a) ·0003; ·2964...... 4. 338 sq ft.

5. 5 per cent. 6. ·316...; ·0001.

Page 78. I—(1870-71. & 1871-72.)

1. 2331. 2. £69215. 18s. $7\frac{43}{64}d.$; £1094. 14s $7\frac{139}{352}d.$

3. (1) 2. (2) $1\frac{485}{748}$. (3) ·4. 4. £11. 3s. $10\frac{47}{48}d.$

5. A can do in $9\frac{1}{2}$ days ; C in 12 days. $A \in $ in $5\frac{1}{4}$

6. $4\frac{1}{2}$ days. 7. £283. 17·056s.

8. £41. 11s. 3d. ; £38. 7s. $5\frac{603}{1753}d.$

9. £6. 14s $7\frac{1}{18}d.$ 10. $7\frac{1}{2}$ hrs.

Page 79. II—(1873-74.)

1. 240. 2. $3\frac{9}{15}$. 3. £2376. 5s.

4. £10. 13s. 4d. ; £11 13c. 4d. 5. £2577. 12s. 1d.

6. $16\frac{1}{14}$ days.

Page 80. III—(1873-74.)

1. 113 7410714285· 2. $\frac{21775}{123712}$; $8435571437.\frac{5377}{26074}$.

3. £4. 1s. 5·9990625d. 4. £205 $18\frac{142}{515}$s.

5. £42129$\frac{17}{2}$. 6. 1s. $10\frac{4059}{6588}d$.

7. Rs. 2 $8\frac{1}{5}$ as· ; Re. 1. $2\frac{5}{2}$ as.

Page 81. IV—(1874-75)

1. 110 $\frac{13}{126}$. 2. 13s. $4\frac{896}{5773}d$.

3. £12. 6s. $6\frac{71463}{200000}d$. 4. £2.

5. $4\frac{69}{25}$ days. 6. 3s. 9d. ; 1s 8d.

7. Rs. 90,702. 15 as. $1\frac{145}{147}$ pie. 8. 16s. 4d.

Page 81. V—(1875-76.)

1. 120100003$\frac{1313}{3850}$. 2. (1) Gain $2\frac{3}{11}$ per cent.
(2) Gain $1\frac{1}{2}$ per cent.

3. $1\frac{1}{2}$ min· 4. 13or6d. 5. $8\frac{7}{10}$ days.

6. Rs. 82,644. $10\frac{6}{121}$ as.

Page 82. VI—(1876-77.)

1. $46\frac{11}{21}$. 2. $2\frac{3}{9}$; $16\frac{343}{207}$. 3. 1s $9\frac{13}{47}d$.

4. A's share = £308. 10s.$3\frac{13}{47}d$; B's = £258. 12s $4\frac{34}{47}d$; C's = £245
4s. $2\frac{40}{47}d$. ; D's = £189. 13s. $1\frac{21}{87}d$.

5. £17. 3s. 6d. 6. 13 min 27 sec. 7. $7\frac{14}{31}$ hrs.

8$\frac{27}{64}$ marks.

Page 83.   VII—(1877-78.)

3004702136721   Forty-three billions two hundred and eighty-seven thousand million, six thousand three hundred and twenty-one.

MCCXXXIV, MDLXVII, MDCCCLIII, MDCCCCLXLIX.

2. 115714886617 ; .115602084880281.

3. £514 3s. 5¾d.   4. 250 acres.

5. Rs. 362 6as. 9·780537 pie.   6. ·289 ; ·0000 0006.

7   66·105 ac. ; 3 c. yds. 21c. ft. 33⅔ c. in.

8   7037 ; 7049.   9. $\frac{3919}{9900}$; 1.

10. A's share = £1567. 9s. 7$\frac{5}{11}$d. ; B's = £2155 5s. 8$\frac{12}{11}$d. ; C s = £1959. 6s. 11$\frac{37}{11}$d. ; D's = £1547 17s. 8$\frac{8}{11}$d.

Page 84.   VII—(1879-80.)

1 ½.   2. 9.   3. 231 days.

4. 66 ac. 0 ro. 13½ po.   5. £3 3s.   6. £4488 15s.

7. ·1762...

8. A's share = Rs. 375 ; B's = Rs. 500 ; C's = Rs. 333 5 as. 4 pie

9. 20.   10. 14$\frac{13}{22}$ days.

Page 85.   I—(1872-73 & 1875-76)

1. 50$\frac{491}{2520}$; 50·171031746.   2. ·2021484375 ; 14 as.

3. 32·8735 ; ·002325 ; ·0482...   4. Rs. 5 7as. 7$\frac{7}{57}$pie.

5. 5 min ; 10 hrs. 42 min. 45$\frac{114}{284}$secs.   6. 1 hour ; ⅛.

7. 90·

Page 86.   II—(1874-75.)

1. $\frac{748}{1008}$; $2\frac{7}{51}$.   2. 500 cubic feet.   3. 49 min. 30 secs.

4. Rs. $845\frac{1}{3}\frac{7}{5}$.   5. Capital = £3808; £4760; £5712. Gain = £232½ ; £290⅚ ; £349.

6. ·28 nearly.   7. $41\frac{3}{4}$.

Page 87.   IV—(1876-77.)

1. $\frac{2}{3}$; $1\frac{29}{42}$, $3\frac{77}{84}$.   2. 16sq. ft, $105\frac{8}{21}$sq. in.; 20·86 cubic feet.

3. £7. 9s.7½d.   4. 12 hrs.   5. 14s $1\frac{59}{61}d$.

6. $1\frac{12}{13}$; 125.   7. £3. 2s. $0\frac{24}{25}d$.

Page 88.   V—(1877-78.)

1. $1\frac{5}{17}\frac{1}{3}$.   2. 1 guinea.   3. 27·501 ; ·063.

4 The former ; Gain 19s. 7⅜d.   5. £5700.

6. £215. 13s. 0d. $1\frac{5}{9}qr$.   7. 45 men.

Page 88.   VI—(1879-80.)

1. $\frac{1}{2}\frac{1}{7}\frac{1}{9}$.   2. ·005511.   3. £1590 2s. 0½d

4. A's amount = 18s. B's = 6s. 8d, C's = 12s.   5. 17s. 2¼d.

6. 60.   7. Gain by the latter investment £24.

Page 89.   I—(1870 to 1880.)

1. (a) $\frac{88}{5184}$ (b) Re. 1. $11\frac{61}{132}$ as.   2. 125.

3. 10 hrs. 50 min.   4. £1500.   5. 57965. 12s.

6. £924. 11s. $1\frac{43}{99}d$; £357½.   7. 1s. $10\frac{20}{40}d$.

Page 91—II.

1. $\frac{8}{9}$; $1s.\ 2d.\ 1\frac{1}{1}\frac{3}{2}q.$ 2. $4s.\ 1\frac{7}{2}d.$, $19s.\ 2\frac{6}{5}d.$
3. Rs 3. 12 as. 6 pie.   4. 14 persons.
5. A's = 120; B's = 75; C's = 125.   6. £204 $\frac{9}{4}$; $\frac{7}{8}d.$
7. $8\frac{3}{5}$ hrs.   8. £3. 3s. $11\frac{7}{4}d.$

Page 91.—III.

1 $1\frac{58081}{693000}.$ 2. $2\frac{15827}{500J2}$; $\cdot021.$
3. Rs. 142. 14 as. 8 pie.   4. Rs. 57 2 as, $11\frac{13}{56}$ p.e.
5 8 weeks.   6 Rs. 5.
7 Rs $38\frac{72}{81}.$ 8 10 per cent.
9 A's share = Rs $586\frac{1}{2}$; B's = Rs. $394\frac{5}{17}$; C's = Rs. $352\frac{7}{17}.$
10. $3\frac{1}{4}$ days.

Page 92.—IV.

2 524.   3. (1) 5.   (2) 12 cwt 2 qs. 14lbs,
                                $8oz.$ (3) $\frac{1}{500}.$
4 $\frac{37}{80}.$ 6. $2\frac{1}{2}$ hours.
7. 256 shots ; £3. 7s. 6d.   8. £2440 ; £73. 4s.
9 18 days.   10. 12.96 , 1400 yds.
11. 11 : 12.

Page 94 —V.

1 $5\frac{87}{151}.$ 2 256 256.   3. $59\frac{473}{2598}.$ 4. 06515'25.
5 27 cub ft. 1499 cub in.   6. $9\frac{1}{4}$ days.
7. 12 maunds.   8. £152. 7s. 4d. $1\frac{29}{600}d.$
9. 880 : 111.
10. $10\frac{10}{11}$ min., 3 o'clock, $27\frac{3}{11}$ min.; $43\frac{7}{11}$ min.
11. £20$\frac{493}{617}.$
12. A's loss = Rs. 450 , B's = Rs. 900 ; C's = Rs. 2,250.

Page 95.—VI.

1. ·34925 ; £44. 18s. 6d. ; $42\frac{15}{43}$ gns. ; 42 785142.
2   1·5342304 ; 65 2864 ; 0.   3. $\frac{03}{1.35}$; $\frac{711}{84}$.
4   100375 cub. ft·; Rs. 125468. 12 as.
5. $28\frac{4}{5}$; Rs. 133. 5as. 4 pie.
6. Rs. $2,884\frac{07}{75}$.   7.   The latter ; 28 yearly.
8. $9\frac{13}{16}$ days.   10.   £182$\frac{3}{8}$.

Page 90.—VII

1.   87.   2. $\frac{350}{750}$; $\frac{55}{65}$. $\frac{17}{45}$.
3.   129·63.   4. $42\frac{326}{675}$ yds.
5   18s. $2\frac{1}{2}d$.   6.   £2050 ; £187. 16s $1\frac{21}{44}d$.
7. $3\frac{37}{84}$ hours.

Page 96 —VIII.

2   $2\frac{511}{700}$; $1\frac{400}{1110}$.   3   A can do in 12 days.
4   400 guineas.   5.   £108 8s. $5\frac{1}{10}d$.

Page 97 —IX.

1   $\frac{746}{4008}$, $\frac{7}{10}$.   2.   1.
3   960.   4.   7 hrs. $3\frac{3789}{5783}$ mi.   7 hrs $7\frac{134}{1444}$ mi
5   5 per cent.   6.   10 hrs.   7.   £2387.
8.   ·3015 ; ·6 .. ..   9.   11th March.
10.   Tin ·827, Zinc 1·512, Lead 1·161.

Page 98.—X.

1. $2\frac{07087}{12121676}$; $4\frac{314}{3410}$.   2 $\frac{14577}{26354}$, 1824.

3 687½.   4. 15000   5 640 days.
6 Rs 8655⅜⅗⅞.   7. ₇₁ in   8 10698⅗⅙.
9 ₁₇₇₁/₃₀₀₀.   10. 29⅓⅞; 15⅜⅞.

Page 99.—XI.

1. ₁₁₃₆/₁₃₆; 5½; 0; 7⅓; 1.
2 Rs 767. 13as. 5⅓⅞₀as.   3 8 days.
4 23½ ms nearly.

Page 100 XII.

1 ₄₁₅/₇₄₁.   2. (a) ₄/₁₁ (b) ₇/₄₃.   3. 13, 10½d
4 1⅓ miles per hour, 1 hour.   5. 8d
6 57⅗ hours   7 £1239⅘⅖.
8 £1₁₀/₁₀ 9. 24 08036; ·73.

Page 101.—XIII.

1. ·011655; ·0502; ₃⅛/₅₁₀.
2 A unit is divided into 5 equal parts, of which two parts are
      taken. 18¾; ₄₃/₆₀
3 £6 15s. 10⅞d.; 1⅘⅘.
4 1 6920634, 6 cwt. 1·125 qrs.; 3140625.
5 2 c yds. 21 c ft 552 c. in.
6 ·07122; 3541 9 in.
7 49 3 lbs.   8 £1⅓⅙⅞/₂₇₀.   9 27 yards.
10 £3 18s.

Page 102.— XIV

1. 1·481096   2. Rs. 9. 0an. 10⅔ pie.   3 18 men
4 Rs 1·70883⅓. 5. 23½ days.   6. Loss = 5⅓£.

Page 102 —XV.

1. (a) ·057719 ; (b) Rs. 21.
2 $2\frac{931}{2043}$ ac. , 110 tons. $6\frac{1008}{1919}$ cwt : £3120. 2s. $4\frac{1}{2}d$.
3 His gain $7\frac{1}{2}$ p c   . 4. $358\frac{71.1}{117}$ days.

Page 103. —XVI

1   L. C. M = 1260.
2   (a) $\frac{3}{8}$ (b) $\frac{3}{0}$ 3. ·001.
4. 12 038 ; 1·025,15 ; 1·00485 ; 01030225 , 100.
5   2 " Pure circulating decimals." 13 72619017
6   $\frac{1}{2}$ of a guinea is the greatest, $\frac{1}{4}$ of £1 is the next and
    $\frac{1}{2}$ of 3s $9\frac{1}{2}d$. is the least.
7   £1561 9s $11\frac{11}{16}d$.   8. 20 cannon.
9   £1. 5s. $2\frac{103}{368}d$; £107 18s. $6\frac{102}{368}d$

Page 104.- XVII.

2   $4\frac{23}{43}$; $1\frac{73.3}{460}$.   3   ·01221. .
4. £2399. 19s $8\frac{17}{999}\frac{77}{33}d$.   5. 14s. $7\frac{1}{2}d$.   6   22 women
7   75 days.   8   £273. 8s 9d.

Page 105.— XVIII.

1. $3\frac{33}{126}$; $\frac{30}{78}$.   2. ·296 ; 3s, $4\frac{8}{15}d$.
3. Rs. 746. 10 as 8 pie.   4   3201   5   72 weeks
6   Gold $12\frac{3}{11}$, silver $3\frac{3}{10}$, copper $2\frac{3}{11}$.   7. 8 men.
8. £833. 15s.

Page 106 —XIX.

1. $108\frac{9}{25}$; ·00221142857.   2. ·075.
3. 4c. ft. 8' 8" 7" ' 6"'' ; Rs. 11. 5 as 6 pie.
4. $80\frac{3}{4}$.

Page 106.—XX.

1 5.   2. ·5   3. ·0049 ; ·006545. ·

4 £7. 17s. 5½d.   5. 13 ac, 1ro. ; 14po , 7s 6·648d.

6 £467. 1s. 6¼d. ½q.   7. £9 3s 6⅞d   8 2¼ hours.

9 2880 flag stones.   10. 3½.

Page 107   XXI.

1 900000400064300036·5.   Five billions &c.
   MDCCCLXXVII ; MMI ; CCCCXXXIII

2 52861898176 , 4122846124801.

3 £33. 4s. 3⅞d.

4 11¹⁰⁄₁₁as.   5. Rs 9920. 15¹²⁄₂¹⁷as

6 4·339; ·00000001.   7 ²⁶⁴³⁄₉₀₀₀₀ ; ⁴⁹⁵⁷⁵⁄₄₇₀₀₀ , ⁵⁵²³⁄₈₂₈

8 3549 ; 17576.   9. 5 men.

10. Rs. 2,319.

Page 108.—XXII.

1. 5 ; £16. 8s. 1½d.   2. ⅓₃₀ , 4½⁷.

3. ·03965 ; ·5.   4 1027·68 ; 16·6.

5. ·0429 , ; 13·9968 grs.   6. £34. 8s. 6d. ; £15. 6s 3d.

7. (a) 218⁴⁄₁₁ grs. , (b) 12¹⁷⁄₁₉ days.   8. £1200 ,

9. 47₁⁷⁄₁₇ yrs ; £32½ nearly.   10. 6 000052 , 9.02 nearly

Page 109.—XXIII.

1. ⁸⁹⁄₁₅₁ ; 5⁷⁶⁷⁄₈₄₀₀.   2. £113 nearly.   3 6¼ hrs.

4 6615 hrs.   5. 20.   6. £301. 2s 1⁵⁹⁄₆₅d.

7. 7 hrs.   8. 887½ days.

9. Brandy 18s ,10⁶⁄₃₇d.   Rum 14s. 8⁸⁄₂₇d   Gin 11s. 0⅞d.

10. ·317.

Page 109.—XXIV.

2    $330|2379009\dot{6}$; $34.25586\cdot6$ ..

3.   Each man's share $= 10_{3\cdot20}^{5\cdot1}d.$. each woman's $= 6_{160}^{17}d.$, each
    child's $= 3_{320}^{117}d.$

4. $\cdot0001521$; $\cdot0000000039.$ 5. $1\cdot416$ ...

6. $_{30}^{1}$ per minute.   7. 561020; $160125.$

Page 110.—XXV.

I.   G. C. M. $= 2223$.; L. C. M $= 1134$, $\frac{3}{7}$.

2. 0_{78}^{37}; 14_{480}^{71}.   3. 86497; 1351 .

4. 7; $_{49800}^{44493}$.   5. $_{6}5$ c. ft. 110_{64}^{34} c. in.

6.   £147. 7s. $11_{66}^{11}d.$ 7. $\frac{3}{9}$ gals.   8. 2268 c. ft.

9. $5\frac{4}{2}$ p. c.   10. $6\cdot46.$

Page 111.—XXVI.

1. 86_{5040}^{17993}; 278_{313}^{14811}.   2. 15_{13}^{5} per cent.

3.   Gain 2_{100}^{97} per cent.; Rs. $206_{07}^{13}.$ 4. $34.$

5. 7_{13}^{5} hrs.   6.   Rs. $11,029_{17}^{7}.$ 7. $3_{1}^{13}.$

8.   Rs. $137.$ 8 as.   9. 8_{4}^{1} days.

10. 5_{11}^{9} P. M.; 14_{11}^{4} miles.

Page 112.—XXVII.

2. 4_{88}^{23}; 9.   3.   £1670. 8s. 5d.   4 75 days.

5.   £5500; £5078. 2s. 6d.   6. 15 ft. 4 in

7. 3_{6}^{1}.

Page 113.—I.

1.   9s. 8d. ; £29. 6s. $7\frac{1}{2}d.$

2. 3_{624}^{34}; 1_{24}^{14}; 002; $34\cdot3168.$ 3. $\cdot2317$; $1\cdot6414.$

4.   £8000 ; £7530.

Page 113.—II.

1. 0 ; 4 ; 2499$\frac{2}{2}\frac{4}{5}\frac{4}{6}$; 2500 ; 1$\frac{1}{16}$.

2. 12·3 ; 33·1 ; 3·236 ; $\frac{4}{5}$; 6s. ; ·04895.   3. 1$\frac{1}{9}$. Gain.

4. 12 days.

Page 115.—I.

1. 2400·6 ; 24600 ; ·027045.   2. ·18.   3. £35.

4. £6. 6s.   5. 10 hrs.

Page 115.—II.

1. 1$\frac{513}{1225}$.   2. 1·224.   3. 545·6 ; ·20432 ; 5$\frac{7}{2}$.

4. £98. 2s. 4·5d.   5. 1 qr. 1 lb, 1 oz.

6. £295. 16s. 8d.

7. A's share = £212. 2s. B's = £353. 10s, C's = £368. 17s.

8. 10 per cent.

Page 116.—III.

1. £12. 10s. ; $\frac{4}{5}$.   2. 13·13413.   3. £85. 11s. 1$\frac{1}{2}$d.

4. £51 4s. 3$\frac{1}{2}$d.   5. £15. 10s.   6. £25 ; 9$\frac{1}{11}$ per cent.

Page 116.—IV.

1. 80 per cent.   2. 166$\frac{44}{111}$; 1d. = 1d. ; $\frac{29}{31}\frac{5}{5}$.

3. ·078 ; 800 ; 10s. 7$\frac{1}{2}$d.

4. £1299$\frac{27}{107}$; 2 years.

Page 117.—V.

1. (1) 43$\frac{3}{4}$ (2) 2665.   2. (1) 1d. (2) 1 lb. nearly.

3. £23. 0s. 5$\frac{1}{4}$d.   4. £171. 6s. 8$\frac{1}{4}$d.

5. £32. 7s. 6d.

Page 118.—VI.

1. ·00005·; 150000000.   2. £7. 7s. 7d.   3. £445. 5s. 10d.

4 (£10. 4s.)   5. 81.   6, ·2685546875.

Page 118.—VII.

1. $1\frac{1}{7}$; 2 yds. 2 ft. $4\frac{3}{23}$ in.   2. ·008 ; ·0944...

3. 21 weeks.   4. £1. 5s.

Page 118.—VIII.

1. £313. 3s. 6d.   2. (1) $4\frac{3}{7}$; (2) 4.   3. £5.

4. 600600 ; 6 006.   5. $\frac{7}{8}$·; 14625.   6. $1\frac{1}{90}$; 8 £.

7. 3 tons 4 cwts. 3 qrs. 4 lbs. 13 oz.   8. 171 tiles.

9. The former.|

Page 119.—IX.

1. 3805 yds.   2. 175 lbs. Troy. ; 1008000 grs.

3. £20. 4s. $10\frac{1}{2}d$.   4. (1) $2\frac{8}{21}$ (ii) $56\frac{1}{10}$.

5. 1 cwt. 3 lbs.   6. $\frac{144}{185}$.   7. $6\frac{1}{4}$; 0505

8. 1s. $6\frac{1}{2}d$:   9. 7s. 8d.   10. 19   17.

11. 1182720.

Page 120.—X.

1. 1155 ; 1716.   2. $\frac{85}{144}$.   3. 3 po. 3 yds. 10 in nearly.

4. (1) ·0625 ; (2) 300 ; (3) ·8316.

5 $\frac{47}{66}$oz.   7. $33\frac{1}{3}$ per cent.

8. $9\frac{183}{183}d$.   9 £770.

10. £28557. 4s.

Page 121.—XI.

1. 1.   2. G. C. M. = 121; L. C. M. = 82368.

3. ·0763; ·3125.

4. 13s. 7⅞d.   5. ·1234; 3¹⁄₁₁.   6. £83. 6s. 8d.

7. £21. 7s. 6d.   8. 3⅞.

Page 122.—XII.

1. G C. M. = 111; L. C. M. = 3360.   2. 1.

3 5000; 5·5652.   4. 480 ft., £14.

5 3443; ¼.   6. 1 per cent.

7. £7½.   8. £3600, £126

Page 123,—I.

1 41¾.   2. ⁴⁴³³⁶⁹⁄₃₀₄₄₇.

3. 6 240312; 1000; 6; £39. 5s.

4 37½.   5 4 per cent.

6. 2 per cent

Page 123.—II

1. £10060. 7s. 11½d.; 43172.   2. £46 0s. 7½d.

3. ·0099225; ·76..   4. 24.

5. £326¾¾; £134 ₂₇₈₀₆³⁴³⁷.   6. 40 acres.

7 £155; £5. 14s. 3₂₁₇⁸⁴d.   8. 80 sheep; 9.15 men.

Page 124.—III.

1. £23. 12s. 4½d.   2. 24.   4. 4. 1.   5. 45.

6. 250; 400000.   7. ·008; ·0075.   8. 0625 : ·25; ·01.

9. £871.   10. £63¾.

Page 125.—IV.

1. 60 lbs.   2. 10½ days.   3. —₂₀¹; ⁷⁷⁷⁄₄₄₅.

4. £520.   5. ·0108575; ·02525.

6. ·00014.   7. £2000.

8. 6 min.

ERRATA.

Page	8	Line 21	For	$3\frac{1}{2}$	Read $3\frac{1}{4}$.
„	13	„ 2	„	2s.	„ 2s. $3\frac{1}{4}d$.
„	„	„ 5	„	1530l. :	„ 1520l.
„	15	„ 21	„	157l.	„ 175l.
„	17	„ 14	„	0′ 891′ and 0 73′891′	„ $\begin{cases} 0\ 891\ \text{and} \\ 0\cdot73891. \end{cases}$
„	20	„ 22	„	6·30,072	„ 630072.
„	33	„ 29	„	$\frac{5}{8}$	„ $\frac{3}{8}$.
„	35	„ 3	„	$\frac{6}{12}$	„ $\frac{6}{13}$.
„	38	„ 34	„	$\left\{ 1 + \dfrac{4}{9 - \frac{3}{1-\frac{1}{5}}} \right\}$	„ $\left\{ 1 + \dfrac{4}{9 - \frac{3}{1-\frac{1}{5}}} \right\}$
„	63	„ 28	„	14as. 9 pies.	„ 0an. 1 pie.
„	69	„ 5	„	4691	„ 4690.
„	74	„ 2	„	$8 \times \frac{2}{5}$	„ $8 \times \frac{1}{5}\pounds$.
„	76	„ 18	„	979	„ 925.
„	81	„ 2	„	$33\frac{1}{4}$	„ $33\frac{9}{7}$.
„	87	„ 23&25	„	roods	„ rods.
„	93	„ 9	„	piston	„ cistern.
„	102	„ 25	„	gain	„ lose.
„	130	„ 9	„	$1\frac{11}{108}$	„ $1\cdot\frac{47}{216}$.
„	132	„ 2	„	$6\frac{9}{11}$ min.	„ $12\frac{1}{2}$ min.
„	132	„ 27	„	18·71	„ 13·71.
„	133	„ 26	„	30 miles	„ $26\frac{2}{3}$ miles.
„	134	„ 5	„	12 hrs.	„ 16 hours.
„	135	„ 15	„	$3\frac{1}{2}$days.	„ $14\frac{2}{7}$ days.
„	135	„ 19	„	$3\frac{1}{2}$ oz.	„ 70oz.
„	136	„ 12	„	12 as.	„ 13 as.
„	136	„ 20	„	11 as.	„ 6 as.
„	137	„ 8	„	$26\frac{94}{121}$ in.	„ $11\frac{99}{121}$.
„	137	„ 13	„	Rs. 47.8as.	„ Rs. 77
„	142	„ 21	„	927495	„ 9275351.
„	142	„ 3	„	Rs. 1547 &c.	„ Rs. 1500.

NOTES.

(Analytical, Critical and explanatory).

ON

BURKE'S REFLECTIONS
ON THE
FRENCH REVOLUTION.
IN THE FORM OF QUESTIONS
AND ANSWERS.

———◆———

NOTES.

(Analytical, Critical aud Explanatory).

ON

BURKE'S REFLECTIONS
ON THE
FRENCH REVOLUTION.

Q. 1. Give a brief sketch of the life and character of Edmund Burke.

Ans.—Early life (1729—1761)—

Edmund Burke, the son of an attorney was born at Dublin on the 12th. of January, 1729 (N.S.) In 1741 he was sent to a school at Ballitore in Kildare; and there under a skilful master, Abraham Shackelton the Quaker, he studied for about two years. In 1743 he entered the Trinity College, Dublin and remained there until 1748, when he took his Bachelor's degree. Here he was a fellow-student with Goldsmith. Having completed his college course he proceeded to London to study for the bar at the Middle Temple. Law soon disgusted him, however, with its dry details, though he toiled manfully at it for some years; at last he settled down to the London life of a lettered student, writing for Dodsley, of Pall Mall, an account of the European settlements in America and various other works. The first work, he published in 1756 was entitled. "The Vindication of Natural Society" in imitation and ridicule of the Style of Bolingbroke, and an "Essay on the Sublime and the beautiful. It must have been a pleasant

life that Burke led in London during this period. He became acquainted with men of eminence (such as Arthur Murphy, Garrick, Samuel Johnson, Hume, Warburton, Sir Joshua Reynolds, &c.) who appreciated his genius and in whose conversation he took great delight. In 1756 he went to Bath to recruit his health, weakened by strenuous application. There at the house of his friend and countryman Dr. Nugent he met the lady (Nugent's daughter) who became his wife, and from the time of their marriage (1757) until death parted them she was the comfort and solace of his chequered life. In 1758 his only son Richard was born. In 1759 he started the *Annual Register* and remained its editor and chief contributor for several years.

Political life (1761—1773) (First period)—

Burke's entrance on political life may be dated from his appointment in 1761 as private Secretary to "Single Speech" Hamilton, the chief Secretary for Ireland. He returned to Dublin where after two years' service he obtained as a reward a pension, on the Irish establishment, of £300 a year. But a misunderstanding having arisen between him and Hamilton, he threw up his pension, broke with Hamilton and returned to London.

In 1764 Burke along with Sir Joshua Reynolds founded the celebrated *Literary Club*; but literary society did not call off his attention from the chances of a political career. He became private secretary to the Marquis of Rockingham on his becoming Prime Minister, 1765.

On the 27th. January, 1766, Burke took his seat in Parliment as member for Wendover and on the very first day of his attendance delivered a speech of such eloquence as astonished no less a critic than the Great Commoner who happened to be there and who emphatically congratulated Burke on his success. The Rockingham ministry, however, lived only a few months and it was succeeded by the Pitt and Grafton Ministry, Burke went into opposition with his patron.

At the close of the session, 1768, Parliament was dissolved; and the new parliament met in November of the

same year with Duke of Grafton as Premier Burke was re-elected for Wendover, but he remained in opposition.

The first important political question that arose after Burke's election to Parliament was the Middlesex Election Case. Burke made several speeches to show that Parliament had been acting unconstitutionally and arbitrarily both in the Middlesex Election Case and in the Privilege Cases. Failing to produce any effect he wrote a political pamphlet "Thoughts on the Present Discontents" in 1773. This pamphlet concludes the first period of Burke's political career.

Political life—(1773—1794) (Second Period)—

In 1774 Burke was returned for Bristol; and during those stirring years of the American War he poured out the opulence of a richly stored mind in many noble orations in support of the claims of the colonists.

In 1778 when a bill was brought into parliament, relaxing some of the restrictions imposed upon Ireland by the atrocious fiscal policy of Great Britain, Burke disgusted his constituents (generally Bristol merchants) by an independence of judgment in supporting the Bill.

In 1780 he brought forward a plan for the 'Better Security of the Independence of Parliament', and the 'Economical reformation of the Civil and other Establishments' In the same year Parliament was dissolved. When it assembled again Burke was returned for Malton.

In 1782 on the resignation of Lord North, the Rockingham ministry came to power and Burke obtained the post of Paymaster of the Forces and a seat in the Privy Council. But on the death of Rockingham in the same year, Lord Shelburne succeeded him, upon which Burke with several of his friends resigned. Subsequently on the resignation of Shelburne, Lord North, Fox and Burke under the nominal leadership of the Duke of Portland, formed the *Coalition Ministry* which, however, was shortly dismissed by the king when Fox's India Bill was thrown out.

The principal acts of Burke's political life after this were the share he took in the impeachment of Warren Hastings,

for his mal-administration in India, his opposition to Mr. Pitt's design of forming a limited regency on the king's illness in 1788, and the strong part he took against the authors and defenders of the French Revolution. In the House he avowed his detestation of the revolutionists with such force that a separation between him and Mr. Fox, and many more of his old friends, took place. In 1790 he published his famous " Reflections on the Revolution in France" which attracted great attention, and produced a surprizing effect 'upon the public mind. In 1794, the proceedings against Warren Hastings came to a close and Burke retired from Parliament.

Closing years (1794—1797)—Heavy sorrows darkened the close of the vetern statesman's life. Two years before he retired from Parliament he lost his dear and constant friend Sir Joshua Reynolds ; the year in which he retired he lost his brother Richard, with whom he had always lived on terms of the greatest confidence and affection. But a heavier calamity befell him a few months later by the death of his only son Richard who had been lately returned for Malton in his father's place.

In 1795, he was allowed a handsome pension by the government. It was opposed by his enemies, such as, the Duke of Bedford and Lord Lauderdale. This called forth from the old man that splendid repartee—*Letter to a Noble Lord.* . His last work, *Letters on a Regicide Peace*, showed that he retained to the end of his life his whole powers unimpaired. At last in the 68th. year of his age he passed off quietly in his house at Beaconsfield, on the 8th. July, 1797.

Character—Burke was a specimen of the best and highest type of the Irish character,—ardent, enthusiastic, full of genius, with wit tempered by restraining wisdom, and above all, full of ardent zeal for good, and a healthy and uncompromising detestation of wrong. Intellectually he was the most richly endowed with rare powers of observation and indefatigable industry ; there was no subject which he could not master, and none which, having mastered, he could not expound with unparalleled richness of language. But he

had some defects. His wit is blunt and very often unseasonable; and as usual with a man who has not true humour, he is also without true pathos. The thought of wrong or misery moved him less to pity for the victim than to anger against the cause.

Q. 2. Enumerate with dates the principal works of Burke.

Ans.—The chief works of Burke are :—

1. Vindication of Natural Society.   ...   1756.
2. The Sublime and the Beautiful.   ...   1757.
3. Present state of the Nation. ...   ...   1769.
4. Thoughts on the Cause of the
      Present Discontents   ...   1770.
5. Reflections on the French Revolution. ...   1790.
6. Appeal from the New to the Old Whigs.   1791.
7. Thoughts on French Affairs. ...   ..   1791.
8. Letter to a Noble Lord.   ...   ...   1795.
9. Letters on a Regicide Peace.   ... .   1796.
10. Observations on the Conduct of the Minority.   1797.
11. Speeches.

Q. 3. What are Burke's chief characteristics as a writer?

Ans.—The chief characteristics of Burke as a writer are the following :—

(1) Generous richness and breadth of judging ment.

(2) He is sparing of literary references.

(3) He is one of the few who learnt to connect politics with morality.

(4) Passion, intensity, imagination, rigid truth cogency of logical reason.

(5) He is stiff and over-coloured.

(6) His wit is blunt.

(7) The varieties of his literary or rhetorical method are very striking.
   cf. (a) The superb imaginative amplification of the description of Haidar Ali's descent upon the Carnatic.

(b) The grave, simple, unadorned *Address to the King* (1777).

(c) The sentimental beauty of the picture of Marie Antoinette at Versailles.

(d) The red horror of the tale of Debi Sing in Rungpore.

(e) The learning positiveness, and cool judicial mastery of the *Report on the Lord's Journals* (1794).

(8) Greatness of comprehension.

(9) Sentiments, lofty and fervid.

(10) In all its varieties Burke's style is noble, earnest and deep-flowing He had the style of his subjects, the amplitude, the weightiness, the laboriousness, the sense, the high flight, and the grandeur proper to a man dealing with imperial themes, the freedom of nations, the justice of rulers, the fortunes of great societies and the sacredness of law. Burke will always be read with delight and edification, because in the midst of discussions on the local and the accidental he scatters apophthegms (short instructive sayings) that take us into the regions of lasting wisdom.

Q. 4. What circumstances hindered Burke's success as an Orator ?

Ans.—It is not wrong to say of Burke that as an orator he was transcendent, but he generally failed in that immediate influence upon his hearers which is commonly supposed to be the mark of oratorical success.

His gestures were clumsy ; he had sonorous but harsh tones ; he never lost his strong Irish accent, and his utterance was often hurried and eager. Apart from these disadvantages of accident it is easy to perceive, from 'the matter and 'texture of the speeches that have become English classics, that the very qualities which are excellences in literature were drawbacks to the spoken discourses :—

(1) because he went wide enough into the generalities

that lent force and light to his view, and consequently the arguments are not close and rapid enough to hold the interest of a practical assembly :

(2) because 'the emotion to which he commonly appealed was that too rare one—the love of wisdom ; and he combined his thoughts and knowledge in propositions of wisdom so weighty and strong, that the minds of ordinary hearers' were not on the instant prepared for them. His oratory astounded by its' brilliancy rather than persuaded by its tone and arguments ; and in the long run, the eloquence which failed to command the reason, ceased to captivate the ear. Passionate and in a great degree untractable he was unsuited for party politics, and drifted from all his connections breaking up slowly all party ties, and even the ties of friendship, till he reached at last a state of almost political isolation.

Mr. Green says, "The length of his speeches, the profound and philosophical character of his argument, the splendour and often the extravagance of his illustrations, his passionate earnestness, his want of temper and discretion, wearied and perplexed the squires and merchants about him. He was known at last as the 'dinner-bell of the House', so rapidly did its benches thin at his rising. For a time his energies found scope in the impeachment of Warren Hastings ; and the grandeur of his appeals to the justice of England hushed detraction. But with the close of the impeachment his repute had again fallen............"

Q. 5. *What was the nature of Burke's Political philosophy?*

Ans.—The political philosophy of Burke, though in itself systematic and complete makes no pretense to the character of what is understood by a *scientific theory*. The ground-work of Burke's nature was poetic. His ideas, if conceived by the reason, took shape and colour from the splendour and fire of his imagination. A nation was to him a great living society so complex in its relations and whose institutions were so interwoven with glorious

events in the past that to-touch it rudely was a sacrilege. Its constitution was no artificial scheme of Government, but an exquisite balance of social forces which was in itself a natural outcome of its history and development. His temper was in this way conservative, but his conservatism sprang not from a love of inaction but from a sense of the value of social order, and from an imaginative reverence for all that existed. Every institution was hallowed to him by the clear insight with which he discerned its relations to the past and its suitable connection with the social fabric around it. To touch even an anomaly seemed to Burke to be risking the ruin of a complex structure of national order which it had cost centuries to build up. 'The equilibrium of the Constitution,' he said, 'has something so delicate about it, that the least displacement may destroy it.' 'It is a difficult and dangerous matter even to touch so complicated a machine'.

The basis of Burke's political philosophy was his respect for the collective reason of men, and his sense of the impossibility in politics and morals of considering the individual apart from the experience of the race.—'Nothing universal can be rationally affirmed on any moral or political subject,' was his fundamental doctrine, and he was the last man to lay down any political proposition not subject to the ever varying interpretation of circumstances, and independently of the particular use which was to be made of it.

Q. 6.—*What was the French Revolution? Sketch its history.*

Ans.—The *French Revolution* is a general name for the series of political and social changes, together with the commotions and struggles connected with them, which commenced in France from the 5th. of May, 1789 (the first meeting of the States-general which had never been summoned before since 1614) to the 5th. October, 1795 (the defeat and disarming of the Paris National Guards by General Bonaparte on the occasion of their rising to overthrow the *National Convention*—as the republican parliament was then called).

This put an end to the struggles and changes, and rendered the republican government permanent and undisputed for the time being, namely, until 1804, when Napoleon was proclaimed Emperor.

[Burke's pamphlet (published in October, 1790) only refers to changes which had taken place to that date • (i. e. one year and five•months)].

The chief *causes* which led to the ·French Revolution are :—

(1) The laws and institutions of the mædæval Feudal system which had been relaxed or abolished in•most other countries were still kept up•in France, giving ample scope for royal despotism, signiorial oppression and ecclesiastical corruption, which besides embittering the feeling- of the people also hindered improvement of agriculture and the development of industry, thereby preventing the increase• of subsistence for increasing population, so that the country had been on the verge of •famine. The nobility and the clergy constituted what was called the "Privileged classes," being free from many burdens under which the commons groaned, and vested with privileges which gave most iniquitous powers over the commons. Hence the extreme exasperation of the commons against the Privileged classes, and the reaction in favour of the new theories of Liberty Equality and Fraternity taught by Rousseau and others.

•(2) The bankruptcy of the French Government and the extreme impoverishment and misery of the people resulting partly from the long continued exactions and extravagances of the court and nobility and partly•from a·long series of ruinous foreign wars undertaken to gratify the vanity of the royal family; (e. g. Louis XIV's long wars of conquest against the Netherlands, Germany and Italy with barren results : his share in the war of•the Spanish Succession (1701-13) which brought the country to the brink of ruin: Louis XV's share in the Seven Years war (1756-63), resulting in his overthrow by the ·Prussians and in the capture of the French fleet and the colonies by the English: Louis·XVI's•share in the American War of In-

dependence which, though successful, completed the bankruptcy of the French government.)

From that time French politics consisted of a series of artifices by finance ministers to meet the expenditure of the Government. But it was soon found impossible to carry on the government of the country on the same wasteful principles any longer, and hence the summoning of the States-General.

(3) The writings of such French men of letters as Rousseau, Voltaire, Diderot, D'Alembert, Condillac, Helvetius by undermining all old political, social and religious traditions and ideas and by spreading utilitarian theories, intellectually prepared the people to revolutionize and reconstruct society. In fact, the French Revolution was to a certain extent an attempt to realise the theories of Rousseau.

(4) The effect of the American War upon French politics also contributed to the Revolution, not only by completing the bankruptcy of the French Government but also by exemplifying and spreading among French soldier and people the democratic ideas of the American republicans. Thus even the French general in America, the Marquis of D'LaFayette, was so filled with American ideas that though an aristocrat himself he became one of the revolutionary leaders.

At length the tumults excited by the arbitrary taxation of Brienne alarmed the king into granting the popular demand for summoning the States-General which had been in abeyance since 1614. The States-General, which met on the 5th. May, 1789, was composed of 270 nobles, 291 clergy and 578 commons. Discord began at once ; the king, the nobles and the clergy insisted that they should vote according to estates or orders, in which case the nobles and the clergy could always vote together (as 2 to 1) against the Commons ; on the other hand, the Commons insisted that they should vote according to numbers (i.e. individually), in which case the Commons could outvote the nobles and clergy together. The struggle went on for weeks; the king at length went through the form of dismissing the

States-General and shut them out of their place of meeting. Whereupon the Commons defied royal authority and assembled in a public tennis court, constituted themselves into a National Assembly and invited the other orders to return and join them and vote on equal terms. At length on the 27th. June, alarmed by the attitude of the people, the king consented with ill-will to recognise the National Assembly which commenced to legislate. Meanwhile the royal troops (largely foreigners composed of the Swiss and the Germans) had been gathering towards Paris to overawe the Assembly ; whereupon the people armed themselves by breaking open the royal armoury. They expelled the soldiers and stormed the royal fortress and the state prison of the Bastille. The populace rose all over the country attacked the nobles, burnt their castles and murdered many. Most of the nobility and princes of the blood fled from the country (to England and Germany) and were called Emigrants. The King and Queen then living in the Palace of Versailles (a few miles from Paris) were suspected of designing to flee and join the army at Metz. A mob, seventy to eighty thousand strong, composed largely of women rushed to Versailles, stormed the Palace and carried off the royal pair and family to Paris where they virtually remained as prisoners till their death. The king was executed on the 21st. January, 1793 and the Queen on the 18th. October, 1793. In the meantime the National Assembly, composed chiefly of commons, declared France to be a republic (21st. September, 1792), ruled the country and passed a rapid succession of revolutionary laws :—

(1) Abolishing all privileges of nobles and clergy.

(2) Abolishing all distinctions of rank and title and distributing public burdens proportionally upon all.

(3) Abolishing the monopolies and restrictions that had weighed upon trade.

(4) Establishing freedom of thought and worship.

(5) Appropriating to the state the lands of the Church and those of the emigrant nobles (allowing the Church a moderate subsidy from the state).

(6) Meeting the expenses of the government by issuing

paper notes called *Assignats* each representing the value of so much of the public land (i. e. the land of the church and nobles.)

(7) Dividing the whole country into 83 departments upon geographical and physical principles, i. e. according to the natural confirmation of the country instead of the old artificial provinces, and these into Communes or municipalities.

(8) Reducing the power of the king (without at first abolishing monarchy) from an autocrat to a mere (highest) responsible functionary and servant of the state.

Then from the end of 1789 there was comparative peace owing to the moderation of the great popular leader Mirabeau (who died 2nd. April, 1791). The sanguinary period began from the invasion of the Prussians and Austrians together with the emigrant nobles to restore the old *regime* in August, 1792; and it reached its height in the *Reign of Terror* from May, 1793 to July, 1794, during which period, after having destroyed the remaining princes and nobles, the republican factions took to exterminating each other.

Q. 7. What prevented Burke from seeing the true nature of the French Revolution ?

Ans.—Burke could not penetrate into the social aspect of the Revolution. "The pith of the Revolution, up to 1790, was less the political constitution, of which Burke says so much and so much that is true, than the social and economic transformation, of which he says so little. It was not a question of the power of the king, or the measure of an electoral circumspection, that made the Revolution ; it was the iniquitous distribution of the taxes, the scourge of the militia service, the scourge of the road service, the destructive tyranny exercised in the vast preserves of wild game, the vexatious rights and imposts of the lords of manors, and all the other odious burdens and heavy impediments on the prosperity of the thrifty and industrious part of the nation."

Burke saw only the dangers and disorders of the new

system, but he saw a very little way indeed into the more cruel dangers and disorders of the old.

Q. 8. To what stage had the French Revolution reached when Burke wrote his Reflections?

Ans.—When Burke was writing his most sombre pages, Paris and the provinces were celebrating with transports of joy and enthusiasm the civic oath and federation (constitutional monarchy) the restoration of concord to the land, the final establishment of freedom and justice in a regenerated France. The name of the Republic had never been so much as whispered. The king still believed that constitutional monarchy would leave him as much power as he desired. The clergy, it is true, were violently irritated by the spoliation of their goods, and the nobles had gone into the German territories, to brood over projects of bloody revenge upon their country. From these circumstances, Burke gloomily presaged that a cloud of thunder and darkness was gathering fast and in a short time would burst upon the accursed country.

Q. 9. What, according to Morley, is the philosophical aspect of the Reflections?

Ans.—In one sense, says Morley, we may call the *Reflections*, a political pamphlet, but it is much more than this, just as the movement against which it was levelled was much more than a political movement. The Revolution rested on a philosophy, and Burke confronted it with an antagonistic philosophy. Burke, while seeming only to deal with the French monarchy and the British constitution was, in fact, turning men's minds to an attitude, from which not only the political incidents of the hour, but the current ideas about religion, psychology, the very nature of human knowledge, would all be seen in a changed light and clothed in new colour. Burke's book marks a turning point in literary history, because it was the signal for that reaction over the whole field of thought, into which the Revolution drove many of the finest minds of the next generation, by showing the supposed consequences of pure individualistic rationalism.

Q. 10, What circumstances led Burke to write his Reflections? What object had he in view?

Ans.—The circumstances which led Burke to write his *Reflections* were the following:—

(1) The members of an association which called itself the Revolution Society (chiefly composed of Dissenters, but not without a mixture of churchmen, including a few peers and a good many members of the ·House of Commons) met on the 4th. of November, 1789 to celebrate the anniversary of the landing of the Prince of Orange, which was the first act of the Revolution of 1688. At this meeting Dr. Price, the preacher, and others highly applauded the French people for having carried the principles of the English Revolution to a·loftier height and having opened boundless hopes to mankind. This roused Burke's anger and he set to work upon a denunciation of Price's doctrines with vehement oratorical powers.

(2) No one except Burke foresaw the real magnitude of the political movement in France. But the House was deaf to his voice. This made him appeal to the country by his pen. He had in his portfolio the commencement of a letter to a young Frenchman (Dupont) who had solicited from him an expression of opinion, and this letter he resolved to enlarge and give to the world. He thus appealed directly to the whole English nation, and indirectly to every citizen of the civilized world. He preached a crusade against men whom he regarded as the foes of religion and civilization, and called on the armies of Europe to put down a Revolution whose principles threatened every state with destruction.

In publishing these *Reflections* the chief object which Burke had in view was to recall the English nation to its ancient principles and show the folly and imprudence of the French political movement thereby preventing revolutionary tendencies from spreading among the nation and letting the French people know that the bulk of the English people have no sympathy with them.

Q. 11. What were the remarkable effects·produced by Burke's Reflections.

Ans.—The remarkable effects produced by Burke's *Reflections* were the following :— .

(1) Before the book was published, the predominent sentiment in England had been one of mixed astonishment and sympathy. But Burke's *Reflections* at once divided the nation into two parties and called forth many attacks and answers, of which the most remarkable were Thomas Paine's *Rights of Man* and the *Vindiciæ Gallicæ* of Sir, James Mackintosh. These three works became as it were the arsenals from which men of different parties drew their weapons of attack and defence.

(2) The body of the nation agreed in the fierce and eloquent denunciation contained in this book. The Jacobins steadily went down in public estimation from the day of its publication. Burke's fiery philippic seemed to dry up their strength. Nothing could stand, in public opinion, against Burke's imperious dilemmas.

(3) Like a potent magic it disarmed the Revolutionists of England, and on the continent of Europe its effect was as powerful as it was at home. Thus, the book might justly be called the 'salvation of Europe.'

Q. 12. Give a critical estimate of Burke's Reflections.

Ans.—Burke's famous letter or pamphlet represents the workings of an extraordinary mind at an extraordinary crisis ; and can therefore be compared with few things that have ever been spoken or written. Composed in a literary age, it scarcely belongs to literature, yet it is one of the greatest of literary masterpieces. It embodies nothing of history save fragments which have mostly lost their interest, yet no book in the world has more historical significance. It scorns and defies philosophy, but it discloses a compact and unique system of its own. It tramples on logic, yet carries home to the most logical reader a conviction that its ill-reasoning is substantially correct. No one would think of agreeing with it in the mass, yet there are parts to which every candid mind will assent. Its many true and wise sayings are mixed up with extravagant and bare-faced sophistry : its argument, with every semblance of legal exactness, is disturbed by hasty gusts of anger. But the

tone of the book, was well suited to the occasion. A
loud and bitter cry was to be raised—the revolutionary
propaganda was to be strayed—and to this end all that
could be said against it was to be clearly, sharply, emphati-
cally, and uncompromisingly put forth. With Hannibal
at the gates, it was no time for half opinions, for qualifica-
tion, and for temporisation. The Jacobins were unjust and
unscrupulous, and it was perhaps pardonable to attack
them with their own weapons. From all this we deduce
the critical canon, that properly to understand Burke's
book we must look on him not as a critic, but as an advocate.
The book is not history, nor philosophy, but a polemic.
It is a polemic against Jacobinism, particularly English Jaco-
binism.

*Q. 13. On what grounds does Burke condemn the ad-
dress of the Revolution Society to the National Assembly?*

Ans.—Burke condemns the address of the *Revolution
Society* to the National Assembly, on the following
grounds :—

(1) It is unauthorized by Parliament.

(2) It is unauthenticated by the names or signatures of
those who sent them, so that their abilities and experience
are unknown.

(3) It congratulates the French people on its attainment
of liberty without inquiring whether under the circum-
stances this liberty might be a curse instead of a blessing
to them, and without waiting to see whether the French
people would be able to re-establish their ancient orderly
form of government.

*Q. 14. What are the chief points in Burke's criticism of
Dr. Price's Sermon ?*

Ans.—The chief points in Burke's criticism of Dr. Price's
Sermon are :—

(1) It violates the wholesome rule that politics should
be kept apart from religion.

(2) It teaches the false doctrine that the only lawful
king is he who owes his crown to the choice of his people
and that the king of England is such a king. Burke says

that the king of England in no way owes his crown to the choice of his subjects; Price's doctrine is therefore a covered attack upon British sovereignty itself. Burke holds that the British-Sovereignty is hereditary and not electoral, but admits that in remote times the founders of new dynasties were elected by their subjects.

(3) It falsely formulates *three* rights which, according to Dr. Price, the English people have acquired by the Revolution of 1688, namely—

    (*a*) To choose their own governors.
    (*b*) To cashier them for misconduct.
    (*c*) To frame a government for themselves.

(4) It points out the great defect in the British constitution to be, that it does not provide for adequate representation of the British people. Burke says that the British constitution as it is has stood the test of several centuries.

Q. 16. *How does Burke refute the statement of Dr. Price that the English people have acquired from the principles of the Great English Revolution of 1688, three fundamental rights namely—*

    (1) To choose their own governors ;
    (2) To cashier them for misconduct ;
    (3) To frame a government for themselves ?

Ans.—With regard to the *first* point Burke says :—

(*a*) That the principles of the Revolution of 1688 are set forth in the statute called the Declaration of Rights; but in it not even a word is said, nor even any suggestion made, of the three fundamental rights claimed by Dr. Price. This Declaration of Rights was called 'an act for declaring the rights and liberties of the subjects and for *settling* the *succession* of the Crown,' whence it is evident that these rights and this succession were declared in one body and bound indissolubly together.

(*b*) That in the Act of Settlement (which was passed on the prospect of a total failure of issue from king William and Queen Anne) Sophia is elected only because she is next in *succession* in the *Protestant* line (being the daughter of Princess Elizabeth, Queen of Bohemia, daughter of

James I.), tor which reason the nation submit to a line of foreigners on the English throne.

(c) That if the 1st. 'right claimed by Dr. Price be admitted, it would invalidate the titles of all the sovereigns of England before the Revolution of 1688 and annul all the great constitutional Acts passed under them.

(d.) That the Lords and Commons in 1688 might have done whatever they pleased, even to abolish monarchy ; but they had no *moral* right to act inconsistently with the spirit of the English constitution. The right way of dealing in such emergencies is to reconstruct what survives.

(e) In the person of William there was a slight deviation from the strict order of regular hereditary succession. But it is against all genuine principles of jurisprudence to draw a principle from a law made in a special case and regarding an individual person. Further, the accepting of William as king was not properly a *choice* ; it was an act of *necessity*, for securing the religion, laws and liberties of the country with more firmness ; and all that could be found in this act of necessity to countenance the idea of hereditary succession was brought forward, fostered, and made the most of, by the legislature. In this case the principle of hereditary succession was kept and held inviolable though the direction was altered.

(f) That he was not supporting the Divine Right of Kings when he advocates the principle of heredity.

With regard to the *second* point Burke says :—

(a) That no government can stand a moment, if it could be blown down with anything so loose and indefinite as an opinion of misconduct. James II. (whose case Price advances in support of his second claim) was charged with 'something much more than misconduct. He was charged with having a design to subvert the Protestant Church and also the fundamental rights and liberties of the people.

(b) That the deposition of James II. was so effected as to render the deposition of future sovereigns for misconduct impracticable. This was done by introducing a system

of mutual obligation between the sovereign and the representatives of the people and by the limitation of the powers of both (that is to say, by making the Crown perfectly irresponsible and casting the responsibility upon ministers, by arranging frequent meetings and constant inspection of Parliament and by decreeing that no royal pardon could be granted to one impeached by the Commons).

(c) That the king is the 'Servant of the people' (Dr. Price calls the king, the Servant of the people and therefore responsible to them) in this sense that he must exercise his power for the people's benefit; but he is not their servant in the sense that he must obey the people and be responsible to them. On the other hand, it is the people who are to obey the king through the laws.

(d) That cashiering or dethroning a king cannot be accomplished without a civil war and should be the very last resource while other means have failed.

With regard to the *third* point Burke says:—

(a) That a review of the provisions of the Magna Chartra, the Petition of Right and the Declaration of Right will show, that every great revolution in England has been based upon the principle of preserving the ancient and hereditary laws and liberties of the nation, and never upon the idea of overthrowing them and replacing them by new laws.

(b) That this principle of the preservation of continuity is according to nature. The constitutional life of the nation is never broken any more than the constituted religious or social life.

Q. 16. What, according to Burke, are the two fundamental principles of the English constitution? What are their advantages?

Ans.—The *two* fundamental principles of the English constitution are :—

(1) *Conservation* of established laws and usages.

(2) *Correction* or *modification* in case of emergencies.

Burke says that this policy of *conservation* and *correction* has two advantages :—

(a) It leaves acquisition free, transmits the posterity to what is acquired and at every stage is open to improvement.

(b) It prevents the spirit of liberty from running into license.

Q. 17. Give some account of the Composition, Character and Constitution of the National Assembly. How does Burke criticise them?

Ans.—The States-General convoked by Louis XVI. of France met on May 5th. 1789. It consisted of the two privileged orders, the clergy and the nobility, and of the *Tiers-etat* (commons). The privileged orders refusing to join the third state (*Tiers-etat*) and deliberate in a common chamber, the latter of its own authority, June 17th. assume the title of *National Assembly* and the right to act in the name of France. It consisted of—(1) theorists, devoid of all practical experience, men from the lower ranks of legal profession, ignorant farmers, tradesmen and other low classes; (2) some poor village curates, (3) a few ambitious and self-aggrandizing French noblemen who, by allying themselves with these low tools, tried to destroy their own order.

The fundamental doctrines of the members of the National Assembly were, that all men have equal rights and that a government should be based on fair and equal representation; no element that is non-representative (*e. g.* House of Lords and the Crown) should be allowed to enter into it. The Assembly has discarded all forms of authority such as prejudice, usage, the ancient permanent sense of mankind, &c.

Burke says—(1) The Assembly having no *status*, has no right to act; for, it is neither recognised by any constitutional law of the state, nor on the other hand, does it represent the people any longer, having departed from the instructions it has received from them.

(2) When any good action has to be done it repudiates every rule except that of untried speculation and rash experiments, but when evil has to be done they reverentially follow the precedents and examples of former perpetrators of tyranny and usurpation.

(3) Some of its members have displayed the talents of eloquence and authorship but none of prudence and wisdom.

This is proved by their evasion of every difficulty of statesmanship; and this inability to face difficulties and solve them by patient perseverance accounts for the Assembly's policy of destruction.

(4) The Assembly lacks the qualities of true statesmanship, namely, "to preserve and reform." Instead of this it seeks to do in a few months the work of ages.

(5) Great legislators have sought to establish one solid principle of government and then to leave it to develop itself, instead of arranging all its details beforehand like the National Assembly.

(6) Their rule that those, who have already sat in the Assembly for a term of *two* years, are not elegible for the next term, would disqualify many who are best qualified by experience.

(7) The quadrumanus activity of the Assembly finds faults with every thing, destroys every thing, applies violent remedies to slight political disorders and does every thing in haste.

Q. **18.** *What is Jacobinism? How does Burke reply to the fallacious doctrines taught by the Jacobins?*

In the usage of the day, *Jacobinism* was a vituperative term applied summarily to all opposition to the dominant party. He who doubted Mr. Pitt was set down as a Jacobin, much as he who doubted the Bishops was set down as an infidel. But the Jacobin proper is the revolter against the established order of society. What those who stood by this established order understood by the term, is roughly expressed in Burke's phrase of *Treason against property* —'You have too much, I have too little—you have privileges, I have none, your liberties are essentially an encroachment upon mine, or those which ought to be mine.' These formulas constitute the creed of Jacobinism in its simplest and rudest form, the sentimental antagonism of poverty against wealth. The fundamental fallacy of the doctrine seems to be this, —Civilization, social happiness, the comfortable arts of life, are no gifts of nature to man. They are, in the strictest sense, artificial. The French philosophers, by a gross as-

sumption, took them to be natural, and therefore a matter of common right to all.

The Jacobins held:—

(a) That all occupations are honourable; therefore, any man following any occupation is fit to take a part in the work of government.

Burke replies that all occupations and all men are not honourable, if to be honourable means to be virtuous and wise. But he grants that virtue and wisdom, in whatever person or occupation is found, is the sole pass-port to a honourable place in the government.

(b). That property should be equally distributed, that is, there should be no distinction of rich and poor.

Burke replies that property in its very nature implies inequality in distribution, and that the right of property keeps human society together.

(c). That all property should be personal, i. e. there should be no hereditary property.

Burke replies that hereditary property stimulates virtue and benevolence, which personal property does not.

(d). That property has no right to govern the state; for millions must prevail over units.

Burke replies that this is true in a question of arithmetic, but in politics this means utter confusion.

Q. 19. *Summarise Burke's general observations on what is required in a representative body.*

Ans.—In a representative body, the following elements are required :—

(1). *Men of Property*—(a) because they generally have sprung from ancestors of ability, so that they themselves are more likely to be men of ability ; (b) because being cautious and timid (for fear of losing their property) they serve as ballast to the state, that is, as a safe-guard against all sudden, extreme, and dangerous agitation.

(2) *Men of ability*, because they are men of action and likely to be the moving force of all new legislation and changes.

Q. 20. *In what consist the Real Rights of man?*

Ans.—The real rights of man consist in the following:—

(a). To have the benefit of law and justice.

(b). To enjoy the fruits of one's own labour.

(c). To have the right of heredity.

(d). To have the right to the nourishment and improvement of one's own offsprings.

(e). To have a right to instruction in life and to consolation in death.

(f). To have a right to a fair portion of all which society, with all its combinations of skill and force, can do in one's favour. In this partnership all men have equal rights ; but not to equal things.

(g). To abide by the fundamental rule of the convention on which civil society is based, namely, " no man is to be judge in his own cause" *i. e.* no man is to be his own governor.

Q. 21. State Burke's view of the Origin of Society.

Ans.—Society rests on the development of a mysterious instinct under the guidance of divine law. So that the uses and advantages of social life are entirely an aftergrowth upon the results of the unreasoned tendency, operating through the rude channels of the feelings, of individual human animals to gravitate together. Society is not made, it grows ; and by ways as dark and mysterious as those which from its earliest germ conduct and limit the destination of life in the individual. To this social fabric, religion is a necessary buttress. It is more than this, it pervades and cements the whole ; it is a part of man's rights.

Q. 22. What is the object of Government and what is its relation to the Rights of man ?

Ans.—The object of government is not ' to secure natural rights, as distinct from civil and political rights, but to provide for certain human wants. One of these wants is restraint over the passions. This restraint is only possible by subjugating the passions of the people to a power out of themselves (*i. e.* by no man judging his own cause). Such a government can only be constructed on a basis of

experience and not upon *a priori* reasonings. The abstract principles of government may be perfect in themselves, but their suitableness will depend on the circumstance in which they are applied. Thus the rights of man in a question of government means their advantages, and they vary according to circumstances. These rights, however simple and extreme in theory, must undergo modification and become complex when attempted to be put in practice, until they are reduced to a sort of undefinable middle or into a series of compromises between good and evil. The rights of the people are not identical with their power; for, in order to enjoy their rights they have to delegate their powers to others.

Q. 23.   What noble sentiments, according to Burke, were inculcated by Chivalry, but have been destroyed by the Revolution ?

· *Ans.*—The noble sentiments inculcated by Chivalry were.—

(1) The generous, unselfish spirit of fealty, loyalty and duty to rank and to the tender sex.

(2) The spirit of self-sacrifice and unrevolutionary submission, to persons and principles, which made men happy and proud to obey their superiors and think there was a dignity even in obedience, which made life generous and dutiful and inspired men to defend their country without selfish rewards.

(3) The spirit of honour and manliness which softened the ferocious and made even vice less vicious than before.

All these unselfish sentiments have now been suppressed by the mean and selfish calculations of Utility.

These are, says Burke, the moral effects of the Revolution.

Q. 24.   On what fundamental principles is the European society based ?

Ans.—The European Society is based on *two* fundamental principles :—

(1) the *spirit of honour*,
(2) the *spirit of religion*.

These were embodied in the nobility and the clergy respectively, who by their conjoint action kept alive the spirit of learning and even the arts of commerce and manufacture. The Assembly, by destroying the influence of the nobility and the clergy, have struck at the root of learning and the material prosperity of the country.

Q. 25. To what condition does Burke fear that the French people are drifting?

Ans.—Burke fears that the Frenchmen are drifting into the condition of a people without honour or religion, that is, the condition of the poor, sordid and ferocious barbarians, possessing nothing at present and hoping for nothing hereafter.

Q. 26. Give in brief Burke's defence of Louis XVI. personally.

Ans.—In Burke's opinion Louis XVI. was a mild, gentle and virtuous king, aspiring for the good of his subjects; but he was an *unsuccessful* man. Therefore Price and the foolish worshippers of success abused and despised him. He was not a tyrant: on the other hand, he relaxed his authority and remitted his prerogatives more than any other Bourbon King. [Burke here fails to see that the concessions made by the king to the people were due to compulsion and to the inherent weakness of his character which Burke emphatically calls *suffering virtue*].

Q. 27. How does Burke meet the prejudice of the French Revolutionists that they are following the example of the English?

Ans.—Burke says that the French are seeking the destruction of all established institutions, religious as well as secular; while the English, on the contrary, maintained their hereditary institutions and based them on sanctions of piety and loyalty to the church and crown.
The British political system is composed of *four* elements :—the Church, the Crown, the Nobility and the People; while the French have only one element, namely, the People.

Q. **28.** *What are the effects of Religion upon a state.*

Ans.—(1) Religion gives statesmen a high and worthy sense of their office and raises them above útilitarianism.

(2) In free states, when any one is to some extent a ruler, religion stimulates the sense of duty of the citizens.

(3) In democratic states, the collective sovereign (*i. e.* the people) is without restraint unless they feel a restraint from above, and hence they are apt to lose all shame and overstep all moderation. Religion alone will teach them to commit their power to worthy hands and to teach their own rulers moderation.

(4) Religion prevents inconstancy and versatility in a nation. The stability of laws and of the whole edifice of Government depends on their being sacred in the eyes of the successive generations. By changing them easily and frequently, the traditions of one generation are lost on another and the science of law, the 'collective wisdom of ages', becomes useless. Thus religion by adopting a constant and steady policy teaches the present generation to link itself with future generation. It is in this sense of the link between the present and the future (embracing the permanent interests of both in arts, science and virtue) that the idea of a social contract is a true one (and not in Rousseau's sense) ; and it is religion and state church that alone can give effect to such a social contract.

(5) Religious men mostly conduct the education of English youths. To grant the clergy free scope to exercise a beneficial influence upon national education and morality, and to make it independent of the crown or the treasury, the English people have endowed their church with a permanent revenue over which it has all the rights of private property.

Q **29.** *What arguments does Burke bring forward in reply to the pretexts urged by the confiscators of Church property in France?*

Ans.—The National Assembly confiscated the Church property on the following grounds:—

(1) To redeem the National Debt incurred by the Government of Louis XVI. and his predecessors.

(2) To realise taxes from the clergy who have hitherto enjoyed immunity from taxation.

(3) To put a stop to the vicious lives led by the clergy.

With regard to the *first* point Burke replies :—

(*a*) That it is a violation of justice to pay the national debt out of private property, such as the church endowment was, for, the public debt should be paid out of public property alone. But granting that the public property was not sufficient for this purpose, what private interest can be made to suffer in order to accomplish the end ? Surely only the private interests of the parties concerned, namely, the lender (the fundholders) and the borrower (the king's government); but certainly an unconnected third party, like the ancient landed interest, cannot, in justice, be made to suffer ; and even if the interest of this third party could, in justice, be attacked why was the property of only one branch of it, namely, the clergy, confiscated and not that of the other branch, namely, the nobility as well ?

(*b*) That the Assembly's action was self-contradictory; for, while they held this particular engagement of the King's Government (the liquidation of the national debt to be valid, they repudiated every other engagement entered into by that Government, including even international treaties.

(*c*) That there was no necessity for this confiscation. From Necker's budget, 1789, it was evident to the Assembly that the current expenditure could be met from the current revenue, and that the balance in this revenue together with a moderate general contribution would extinguish the debt. The nobles and the clergy were most willing to contribute. So that there was no necessity for a sweeping confiscation of all the property of one particular section of the nation. Even if the deficit of two millions could not be otherwise met, the clergy might have been taxed to that amount only, instead of being deprived of the whole of their property, worth 5 millions.

'(d) That the plan of confiscation was wastefully 'and dishonestly carried out. It was first proposed to sell for ready money all the confiscated lands, but such a sale might have greatly depreciated the value of lands.' It was next proposed to exchange the Church lands for a stock (Government securities other than money); but to this the municipalities• objected. Finally, therefore, it was decided to issue·a new paper currency, the well-known' *Assignat*, on a loan raised from the 'chief municipalities and having for security the church lands. This loan to be gradually paid off by the sale of these lands; and the sale of these Church lands was so conducted that by a legal shift they fell gratis into the hands of the spoliators.

(e) That the atrocious manner of this confiscation was unparalleled even by that of the Romans (under Sylla who, before they confiscated property, required at least proofs of crime against the owner); or by that of Henry VIII. of England who before he dissolved the monasteries issued a commission of inquiry and asked the sanction of parliament. The Assembly went through not even the froms of justice.

With regard to the *second* point, Burke says that the clergy either pay taxes, direct or indirect, as heavily as the nobility, or have purchased immunity by the payment of nearly a million stirling.

With regard to the *third* point, Burke says that the atheistic libellers had been unable to substantiate any charges of· immorality against the modern French clergy. They have only been able to produce proofs of iniquities of the ancient French clergy; but the moral drawn from history 'does not teach us to punish the living clergy for the crimes of their predecessors.

But Burke admits that the modern clergy were subject to 'the common infirmities of humanity which had every right to toleration.

Q. 30. *What, according to Burke, are the real causes of this confiscation?*

· *Ans.*—Burke says the real causes of the confiscation of church property are:—

(*a*). The antagonism of the monied interest. Property in France was of two kinds, in *land* and in *money*—the *former*, ancient and held chiefly by the nobility and the clergy; the *latter*, recent and held by fundholders *i. e.* the creditors of the national debt. This latter class was hostile to the former as well as to the interests of the masses, and having come into power at the revolution they struck a blow at the landed interests of the clergy.

(*b*) The antagonism of men of letters. After Louis XIV. they ceased to enjoy the favours of the court and therefore repudiated the patronage of court. They were of a distinctly atheistic turn and sought to destroy Christianity: to this end they contrived to secure for themselves the monopoly of fame in learning in all its branches—a fame which had hitherto been enjoyed by the christian clergy. Finally they formed a coalition with the monied interest against the common object of their hatred, the Church and the court-nobles. This coalition is the cause of the popular outburst against the nobles and of the spoliation of the church to pay the national debt.

Q. 31. *What were the evils of this confiscation ?*

Ans.—The evils of this confiscation were :—

(*a*) The violation of the sentiment of reverence for an exalted and ancient institution.

(*b*) Its setting a bad and dangerous example. There has been an increase in the national debts of many European nations. If the governments of these nations are unable or unwilling to meet their obligations to the fundholders, there is danger that the French policy of confiscation may be adopted in these countries. The victims may be, as in France, proprietors of land whose only fault is an innoxious indolence.

(*c*) The atheistical French government granting a pittance for the nominal support of religion.

(*d*) Violation of law, usage and the binding obligation of contracts.

The assembly would reply that the confiscation was not a deed of rapacity, but one of policy. Burke says that there

is no better policy than justice, and the measure was not only unjust, but it was also tyrannical.

Q. 32. On what grounds does Burke denounce pure democratic government as no better, than absolute monarchy? What does Aristotle say on this point?

Ans.—Burke denounces pure democratic government as no better than absolute monarchy on the following 'grounds :—

(*a*) In a democracy, the majority of the citizens is capable of exercising the most cruel oppressions upon the minority.

(*b*) In a democracy, the oppression of the minority will extend to far greater numbers, and will be carried on with much greater fury, than can almost ever be apprehended from the dominion of a single sceptre.

(*c*) In such a popular persecution, individual sufferers are in a much more deplorable condition than in any other.

(*d*) Under a cruel prince the sufferers have the balmy compassion of mankind to assuage the smart of thei wounds ; they have the plaudits of the people to animate their generous constancy under their sufferings ; but those who are subjected to wrong under multitudes are deprived of all external consolation. They seem deserted by mankind and overpowered by a conspiracy of their species.

Aristotle says that both in a democracy and in a tyranny the ethical character is the same :—

(1) Both exercise despotism over the better class of citizens.

(2) The decrees are in the one, what ordinances and arrets are in the other.

(3) The demagogue and the court favourite always beat a close analogy ; and these have the principal power, each in their respective forms of government—favourites with the absolute monarch, and demagogues with the people,

Q. 33. By what Standards does Burke test the goodness and efficiency of the old French monarchy?.

Ans.—Burke tests the goodness and efficiency of the old French monarchy by these standards :—

(A) The Standard of *Population*.

If population flourishes in a country that country cannot be very ill-governed. Burke shows that the population of France has rapidly increased during the two preceding reigns. But he remarks that although this was due to natural causes, yet if a bad government had existed in France, it would have checked this natural action.

(B) The Standard of *National Wealth*.

(1) On Necker's authority the wealth of France as estimated by the amount of *Specie* alone was very large in 1785. This immense sum of money could not have been retained in the country, unless in it' industry was encouraged property, secure and government, good.

(2) Material wealth of France other than *Specie* (such as cities, means of communication, merchant ships, defensive works, charitable institutions &c.) was also very great under the monarchy.

(3) During the monarchy France was rich in the immaterial wealth of intellect and genius.

(C) The Standard of *Patriotic Spirit*.

An earnest endeavour towards reform and patriotic spirit was displayed by the government of Louis XVI.

On the other hand, the present government show (*a*) that the population of France has suffered by depletion and emigration; (*b*) that the *Specie* of France is decreasing with the result of throwing labour out of employ and increasing pauperism.

Q. 34. State Burke's remarks on the French nobility.

Ans.—As the Assembly attacked the clergy on the score of their temporal possession, so they attacked the nobility on the score of their vicious lives, comparing them to lawless robber-knights of the middle ages. • But, says Burke, the nobility did not deserve this comparison; for by a warmly advocated reform they renounced many of their privileges at the meeting of the States General, 1789. The • French have always admired and idolized Henry IV. If so,

they should also respect that order which he loved and honoured, namely, the nobility. Burke appeals to his personal experience to show that the nobility of his time have not degenerated from their ancestors in Henry IV's time, either in their bearing towards their equals, or in their treatment of the inferior classes, or in their conduct as landlords towards their tenants. But side by side with these good qualities of a public character, the French nobility had faults of private life. But the gravest error which led to their ruin was that the nobility, or the *aristocracy of birth*, disdain to be on friendly terms with the monied interest, or the *aristocracy of wealth*; thus driving the latter to a coalition with the theorists, or the *aristocracy of intellect* for the destruction of the first.

Nobility is a graceful ornament to the civil order. It is the Corinthian capital of polished society. The Assembly after destroying the nobility has been unable to fill up its sphere.

Q. 35. *State Burke's remarks on the French clergy and the New Church System introduced by the Assembly.*

Ans.—The Assembly has charged the clergy that they lead a very vicious life. But Burke replies that the industry of the atheistic libellers had been unable to substantiate any charges of immorality against the modern French clergy. They have only been able to produce proofs of the iniquities (St. Bartholomew's massacre &c.) of the ancient French clergy; but the moral drawn from history does not teach us to punish the living clergy for the crimes of their predecessors. The clergy, Burke admits, had faults which do not go beyond what is allowed to human infirmity or to professional weakness. Burke appeals to his personal experience to show that towards the end of Louis XVI.'s reign, no public feeling existed against the clergy in France, and implies that it was the machination of the Assembly alone that have roused this unjust public feeling.

The Assembly by destroying the ancient Church system has introduced a new system of its own:—(1) It has virtually

abolished the rank of bishops, thus destroying dignity of character in the church. (2). It has also virtually abolished the rank of the middle clergy, thus destroying the learning of the church. (3) It has left the discharge of the whole of the functions of the church in' the hands of the lower clergy, who, in point of dignity of character and proficiency in learning, is quite unfit for the task. (4) By making the clergy elective it has made it unfit in point of independence of character to guide the church and the people.

This inefficient system is really meant to be only a preparatory step to the total abolition of the clergy; in conformity with that principle of the Assembly that a state can exist without a religion and in furtherance of that plan of "civic education" which the Assembly intends to substitute for religious education in the state economy.

Q. 36. What is Burke's view of the philosophy of History?

Ans.—Burke says, the study of history is a means by which we may gain wisdom for our future direction. It teaches, above every thing, that the miseries, of which it is but one long record, have really sprung not from religious or political institutions, but from the inherent passions and vices of human nature itself which cannot be eradicated by any political reform. Religious liberty, political institutions &c. are only the external occasions or pretexts for disorder and evil, the real cause being in the men themselves. Thus, when one external occasion or pretext of evil has been removed, the inherent viciousness of the human nature soon embodies itself in another form.

Q. 37. How does Burke reply to the argument of the Jacobins, that in their church policy they have followed the example of the English during the Reformation.

Ans.—(1). The Assembly, thinks that in persecuting the Roman Catholic Church it has only followed the example of the Protestant countries, such as England in her conduct at the Reformation.

Burke replies that such is not the case; for, the English reformers in piety of life, in Christian belief and in heroic

martyrdom, bore no resemblance to the wretched atheists who have overturned the French Church.

(2) The Assembly thinks that like the Protestants they are *tolerant*.

Burke replies that the English Church tolerates because it respects the principle that underlies all religion; but the latter tolerates because it despises all religion alike.

(3) The Assembly thinks that in confiscating the property of the monastic orders, it has done what England herself did with regard to the lands of her deans and chapters during the Long Parliament.

Burke replies that in the case of England also gross injustice was done by the violation of the *rights of prescription*. So that the danger lies in the principle of injustice, and not in the particular description of persons wronged, whether monastic orders, deans or chapters.

'*Q 38. With regard to the Monastic System of France what results, does Burke show, might have been produced had the policy of conservation been employed?*

Ans.—Burke shows that the following might have been the results had the policy of conservation been adopted.

(*a*) The monastic system of France furnished the material with which a true politician could have accomplished many public ends. A body of men, fifty thousand in number, forbidden by their principles to seek self-interest and enjoined to implicit obedience, and a large revenue from church lands all available for public purposes might have been turned to good account by any able politician.

(*b*) 'Conservation could have availed itself of even the superstition of the monastic orders for furthering beneficient public ends. This monastic superstition is the religion of feeble minds; yet it is a good superstition that builds. But it was not wisdom on the part of the Assembly, but superstition of a much worse type, namely the evil superstition that destroys, which overthrew the monastic system.

(*c*) From the point of view of the political economist, conservation would have kept the monks in the undisturbed

enjoyment, of their property; for, the monks fulfilled the functions of capitalists more . truly than those whom the Assembly substituted for them. . This function consists in spending the rents obtained from land back upon the labourer, in such a way as to cause the least injury to the morals of both capitalists and labourers.

(d) The policy of conservation would not have confiscated the church lands, on the mere ground that they were not held through any right of inheritance; for, in their case there was the equally strong right of piety, morals and learning.

Q. 39. *What were the three bases of the New Legislature as constituted by the National Assembly? State Burke's objections to each and all of them.*

Ans.—The plan of the New Legislature, has *three* bases :—

i. The *Geometrical* basis (the basis of the territory) according to which the country was divided into *Departments, Communes* and *Cantons* for the purpose of representation. Burke objects to this symmetrical division on the ground that it furnishes no reasonable basis for a just representation, since one electoral square differed greatly from another with regard to population, fertility and wealth. In this no statesmanship is required; it is merely the business of engineers.

ii. The *Arithmetical* basis (the basis of population) according to which the *primary assemblies*, namely, all the qualified citizens of the *Canton* elect deputies to the *Communes* (district). These *communes*, chosen by the *Canton* choose to the *Department*; and the deputies of the *Department* choose their deputies to the *National Assembly*. Each of these memberships (from the *Canton* up to the *Assembly*) required small amount of qualification, either in labour (three days' labour) or in money.

Burke objects to this plan, as being inconsistent with their theory of the equal rights, of man.

iii. The *Financial* basis (the basis of contribution) according to which the power of voting was regulated ac-

cording to contribution (*i. e.*, the amount of taxes paid to the state).

Burke says—(*a*) this is inconsistent with their theory of the equality of man, since it leads to the establishment of an aristocracy of the rich.

(*b*). It does not remove the great evil of all political inequalities, namely, giving the rich power to crush the poor; for, the rich districts could crush the poor districts; on the other hand, it destroys the chief good of such inequalities, namely, extending additional security and additional rights to property.

(*c*). The wealth is measured by the direct contributions of a district; whereas a great portion of the wealth is manifested through indirect contributions, namely, taxes on commodities.

(*d*). The system of direct taxation is not clearly defined.

Burke's objections to the whole system :—

(1) It produces a conflict between the principle of equality, or democracy, as represented by the basis of population and the principle of inequality, or aristocracy, as represented by the two bases of territory and contribution.

(2) To split up France into a number of independent republics without any principle of unity or subordination (under pretext of creating local or civil independence) would completely destroy national unity. (This was exactly the policy of Rome when she " liberated Greece.") The members of a body so elected will be strangers to one another and shall have no touch with their electors; such as the magistrates and bishops under the old system had.

(3) The universal equality advocated by the Assembly is really the result of this ignorance of human nature. The great legislators of antiquity, who understood man and saw that all men cannot be equal and alike, made a classification of citizens the basis of all their legislation. The Assembly, on the other hand, rejected all classification, seeing nothing more in the citizens of France except that they represented so much number and quantity.

(4) The Assembly, while it thought that by its levelling system it had destroyed arbitrary government and the tyranny of the strong over the weak, really paved the way for a return of despotism in even a worse shape.

Q. 40.   *What were the only bonds of union and common action left between the many republics into which France was split up?*

Ans.—The French legislators intended to hold the several new republics of France together by these means :—

(1) The confiscated lands and the compulsory paper currency annexed to it, which were common to all.

(2) The supremacy of Paris. By destroying all local and provincial connections and transferring all power and privileges to Paris, the Assembly has paved the way for a complete denationalization; for a true national spirit is the outgrowth of local spirit. This power of Paris is vested in the hands of the National Assembly, subject to no control ; a body so constituted will have every temptation to proceed to absurd extremes. A salutary control could have been secured by the establishment of a separate chamber like a senate, corresponding to the English House of Lords.

(3) The general army of the State.

Q. 41.   *State Burke's view of the Executive Power of France through which the Assembly acted. What should it properly be?*

Ans.—The chief executive officer was the King. But he was divested of all power and made a mere tool by the Assembly. Thus, in his *civil* capacity he has no power over the Judicature, and he does not appoint the judges but only confirms their nomination. In his *political* capacity he merely carries out the coercive orders of the Assembly, but he cannot reward or pardon.

The position of the ministry also was one of servitude, without the confidence of the King, because not chosen by him and without influence over the Assembly, because nominated by it.

Such an executive cannot be expected to serve the country with zeal, or to be respected in their negotiations with foreign states.

Burke says that an executive power should be efficient. It should command respect and possess independence of action. It should be so constituted that those who compose it should be disposed to love and venerate those whom they are bound to obey.

Q. 42. What, according to Burke, are the evil effects of the new Judicial System introduced by the Assembly?

Ans.—The constitution and the effects of new Judicial System introduced by the Assembly :—

(a) The judges were elected; they were not independent, for their judgment could be reversed by the Assembly. They had to proceed according to codes fixed by the Assembly. A new court was instituted, called the *Court of Chatelet* (from the place of meeting), to try political offences referred to it by the Assembly, or brought before it by private spies.

(b) The Assembly was exempted from the jurisdiction of the new law courts.

(c) These courts were strictly provincial or local. Under the pretence of remedying this defect the Assembly proposed to establish a " Grand State Judicature" to judge crimes against the nation i. e. in reality against the Assembly.

These were the steps for facilitating the change from democracy to despotic oligarchy," which was the secret object of the leaders of the Assembly.

Q. 43. State Burke's view on the Army organisation in France.

Ans.—Burke says, the national army is large but without proper discipline, owing to the principle of equality of all men ; so that the country will soon fall under a military democracy. The conduct of the Assembly at this crisis is highly injudicious. Instead of taking prompt and severe measures of repression, it proposes the imposition of addi' tional oaths to the 'army that has already violated all

, oaths of allegiance and obedience. Further it orders
.ne soldiers to join themselves with the clubs and con-
federations in the several municipalities, and mix with
them in their feasts and civic entertainments. This jolly
discipline, the Assembly says, is to soften the ferocity of
their minds and stop conspiracies. The following effects
will result from the Assembly's conduct in this respect :—

(1) The soldiery will have a bad effect on the munici-
palities and *vice versa*. Mutinous soldiers mixing with
mutinous citizens will only increase the evil.

(2) The officers, nominated by the King and confirmed
by the Assembly, will cling to that side that has the real
power of appointing them and will despise the other side.

(3) The soldiers by applying the theory of the equal
rights of man will elect their own general who will subse-
quently make himself master of all. (Napoleon).

(4) All instinctive loyalty being destroyed, the army
becomes the great means of government to keep the coun-
try in good order and force the farmers to pay rent. The
people are taught that all men being equal they ought not
to till the ground for idle monks or noblemen, whose only
title to the property of his ancestors is a piece of rotten
parchment; now they will object to till the land for idle
patriots, whose hands are full of confiscated property.

(5) The Departments will refuse to acknowledge the
authority of the Assembly as being self-constituted bodies.
The only means of ruling them will be the military, and
the result will be a civil war,

The Assembly also proposes to construct a municipal
army to act as a counterpoise to this national army; but
the new army will only make the confusion worse con-
founded.

Q. 44. *What were the Assignats? What was their
origin? Point out, after Burke, some of the ill effects of
the Assignat system. How does Burke discuss it?*

Ans.—The *Assignats* were the paper-currency issued by
the National Assembly in France during the French Revo-
lution. These Assignats represented land *assigned to* their

holder. After having confiscated the church' lands' the Assembly thought that an immediate sale would greatly depreciate the value of lands; so it decided to issue the Assignats on a loan raised from the chief municipalities, and having for security the church lands.

The effects of the *Assignat* system were :—

(a) The paper currency, not backed by any bullion deposits, will place all power and authority and consequently the interest of the whole nation into the hands of the managers and conductors of this circulation; so that other classes, the agriculturists, landed proprietors and professionals will be deprived of all power of union and joint action.

(b) The stock-jobbers, who purchase lands when they are cheap with the paper currency, will sell those lands again, when they are dear, for the paper currency. So that no improvement will be made on lands and no benefit conferred on the agriculturist.

(c) Industry, economy, prudence will all disappear; for a spirit of gambling prevails over the whole country.

(d) The masses will be duped by the few that understand the game ; so that these few are the gainers at the expense of many.

Burke says that the proper method of conducting credit business upon such a land bank as security, is to ascertain first the gross value of the land, to deduct therefrom all charges, to strike a net surplus and then to issue Assignats or credit bills only on the amount of that net surplus.

Instead of this the Assembly confiscated the church lands on a promise of providing yearly for the support of the clergy and state religion ; then without calculating either the gross value or the net value of the lands, it issued Assignats on them for 16 million sterling at once. It discharged any debt, due by the state, by the payment of Assignats without any provision having been first made, as promised, for the support of the clergy and the state religion, and the result is that there are not sufficient funds for this purpose. Thus the national faith has been grossly

violated. Further without deducting charges from the gross revenue of the church lands, they have added fresh charges to them, in the shape of (a) pensions for the disbanded judicature and (b) the interest upon the Assignat already circulated. The result of the Assembly's method has been that while in the market the value of the Assignats has depreciated to the extent of 7 per cent., the Assembly itself receives payments in Assignats to their full value, so that the state treasury is being impoverished by being filled with the depreciated currency.

Q. 45. *What, according to Burke, are the duties of a Financier ?*

Ans.—The duties of a Financier are :—

(a) To secure an ample revenue.
(b) To impose it with judgment and equality.
(c) To employ it economically.
(d) When necessity obliges him to make use of credit, to secure its foundations in that instance, and for ever, by the clearness and candour of his proceedings, the exactness of his calculations and the solidity of his funds.

Q. 46. *What does Burke say on the Financial System of the National Assembly ?*

Ans.—Burke says that the doings of the Assembly with regard to their finance have not realised a single one of the objects of a financier.

For—(1) It has diminished the revenue by 8 million stir ling, or one-third of the total revenue by abolishing the salt tax ; and the result is that the total taxation on provinces that formerly paid the salt tax is now unduly lightened, while the total taxation on the other provinces continue the same as before; thus giving rise to an unjust inequality in the distribution of the burdens of taxation.

(2) It has not effected any curtailment of expenditure to correspond to the diminution of revenue.

(3) It has evaded the difficult question of adjusting the taxes, according to the tax-payer's ability to pay, by framing a new system of benevolences or patriotic contributions (like one of the financial trickeries of Louis XIV. and

Louis XV.) according to which each citizen is to pay as taxes one-fourth of his income estimated on his own sense of honour.

(4) It has adopted the vicious system of an inconvertible paper currency (the Assignats) not supported by any deposits of coin or bullion in the bank.

(5) It has, on the failure of its Assignat policy, devised the foolish scheme of coining the church-bells and has had recourse to other shifts of fradulent bankrupts.

(6) It has caused distress and misery in Paris itself. If this be the case with Paris, upon which the resources of the whole country have been lavished, it must be much worse with the country itself from which these resources were abstracted.

Thus the Assembly has not fulfilled its profesesd object, that by diminishing the public revenues they would relieve the public tax-payer from burdensome contributions. No such relief has been effected. Burke lays down, that it is a sounder principle of finance that the people should pay largely in taxes and gain largely from the state, in the shape of general good government in return, than that they should pay no taxes and gain nothing from the state in return.

EXPLANATORY NOTES.

(1)—(Page 9)—*This would be ......countenance*—This refers to Don Quixote, who is called the *Knight of the Rueful Countenance* by Sancho Panza, his 'squire.' By the term 'Metaphysic,' Burke alludes to the Knights of the middle ages freeing criminals on the ground of the abstract right to liberty, without regard to circumstances. Don Quixote fancied that the Romances of chivalry were true histories, that the whimsical duties and customs described in these were practicable realities, and endeavoured to practise them himself and compel other people to do so. In the same way, the Assembly was mistaking the insane and abstract ideas of liberty given by Rousseau, Voltaire &c. to be practicable realities and insanely trying to realise them.

(2) —(p. 11)—*The beginnings of. ......itself*—Here is an allusion to the story that the Titans once waged war with the gods, and, in order to scale Mt. Olympus, the abode of the gods, they heaped Mt. Pelion upon Mt. Ossa.

By 'confusion in England,' Burke perhaps means the efforts of the Dissenters to repeal the Test Act and Foxe's Bill, 1790.

The plain meaning is this—In England, the confusion is at present not very great ; but in France, where the confusion is still less, the Revolutionists are advancing, step by step to abolish monarchy.

(3)—(p. 12)—*I know they set him......designs.—*

Philippize (speak on one side) is a Greek expression used by Demosthenes in his *Philippics*, in which he remarks that the Delphic oracle always philippized, that is, prophesied in accordance with the designs and wishes of Philip of Macedon.

The Assembly thought Dr. Price to be an inspired prophet, because, in good faith (says Burke sarcastically) he

always expresses opinions corresponding to the opinions of the A se ibly.

(4)—(p. 14)—*It would certainly be......dissent—*

Nondescript (from L. *non*, not, and *descriptus*, described) literally means a thing not yet described and classified. Here it refers to *new doctrines*.

Hortus Siccus means a collection of dried plants. Here sarcastically used for the doctrine of the Dissenters.

Burke says sacastically that Dr. Price's sermon would be a fresh and valuable addition to the numerous old and hackneyed opinions of dissenters.

(5)—(p. 15).—*I should only stipulate. ....pulpits—*

Mess John, means *Parsons* in a familiar sense. *Mess* is an archaic corruption of *Magister*: the term is of Scottish origin. Burke says, the only stipulation I make and insist upon is that these new and inexperienced Parsons, dressed up in their titled liveries and crested helmets, ought to put some restrictions regarding the establishment of a democracy and the illuding principles and maxims of the levellers, which they generally give out in the course of their sermons.

(6)—(p. 25)—*They acted by the ancient ....people—*

Thorgh at the two critical periods of the Restoration and the Revolution, their constitution was in one respect broken, they continued to act through their old political organization, consisting of the Parliament of two states, Lords and Commons, and did not split asunder into a multitude of distinct molecules, that is, contending parties and interests like the French.

(7)—(p. 29)—*We ought not, on either side......liberty—*

The reference here is to the Act of Navigation, which provided that no goods could be imported into England in foreign ships, unless the goods are the products of the country from which they are exported.

Burke says, you should not allow false doctrines to be imported into your country and taught there as if they were of British origin ; and we, on the other side of the English channel, must not allow them to be smuggled into our country and taught here as if they were of native origin,

in the same way as foreign goods are smuggled into the country in contraband ships and sold as native products.

(8)—(p. 33)—*Kings and nations..:...Fisherman*—This alludes to the Popes who claim to be the representatives of Christ (who was the Servant of man) and therefore to be 'Servant of Servants;' yet they claim the right to depose and appoint Kings.

The signet of the Fisherman—The seal of Peter, the Fisherman. The Popes hold Peter to have been Christ's successor and his representative on earth and themselves to be the successors of Peter, inheriting, as it were, his seal, that is, his privileges.

(9)—(p. 34)—*And we, on our parts, have learned . . Babylonian pulpits*—Here the reference is to the tradition that all men had one primitive language, before the building of the Tower of Babel ; and God, in order to frustrate the designs of the builders of Babel, confused their language ; so that they were unable to understand each other and proceed further in their work Hence, *Babylonian pulpits* means pulpits of non-conformists which exhibit a great confusion of conflicting language and opinion.

Burke says that we speak and interpret the plain language of law in which the king is mentioned as our 'sovereign Lord, the king'; and not the meaningless jargon of Dr. Price and his party.

(10)—(p. 39)—*Our political system is......progression*—Burke says that the English constitution is in accordance with the natural order of the world. For, as in the continuous and corporate existence of the world, the human race taken as a whole is never old, or middle-aged or young (though individuals or nations can) but is in a state of unchangeable constancy, so the English constitution (King, Lords and Commons), taken as a whole, is in a state of unvarying constancy, though parts may be reformed or improved. In the English constitution, as in the natural order of the world, there is no solution of continuity.

(11)—(p. 45)—*Everything human and divine......conse-quences*—Even the property of private parties, such as the pro-

perty of the nobility ('human') and the clergy ('divine') had
been appropriated by the Assembly for defraying the public
debt; and the result was national bankruptcy.

(12) –(p. 57)—*The association of taylors.*.. *..force them*—
It is quite against nature that companies of tailors, car-
penters, &c. (of which the French republic was composed)
should conduct state affairs. By forcing them to do so
you attempt to deprive nature of her prerogative of making
men high or low as she pleases and to reduce them all to
one dead level in spite of nature.

·(13) – (p. 61)—*This sort of discourse ... .ridiculous*—
This alludes to the practice of the Paris mob, even in
the earlier phases of the Revolution, of seizing on popular
persons in the streets and hanging them on lamp-posts
without trial.

Burke means to say that this sort of discourse may find
favour with the mobs, but not with deliberate and reason-
able persons.

(14) – (p. 69) –*Let them be their . ..overwhelm us*—
Levanter (from, *Levante-* the point where the sun rises)
is a furious easterly wind in the Mediterranean.

The Latin expression means—Let Æolus rage and rave
in that hall of his and reign supreme in the closed prison
of the winds. ‹ The allusion here is to the mythical
account, given in Virgil's Æneid, of Æolus, the god of
the winds. He is shut up by the other gods in a cavern
in the heart of a mountain where he rages and raves furi-
ously with all his winds, but he cannot get out to devastate
the world.

In the same manner, Burke says, let the pedants, who
exult in their anarchic doctrine of the rights of man, be
shut up in their schools and let them fret and rage there as
much as they like. But let them never get out to bring
disorders on their country with their mischievous doctrines.

(15)—(p. 72)—*These metaphysic rights......straight line.*
The abstract natural rights of man are altered and modi-
fied by circumstances, as a ray of light is distorted and
modified when passing through a refractive medium of water,
glass, &c.; so that what was metaphysically right i. e. right

in the abstract may be wrong in complex circumstances of society.

(16)—(p. 73)—*Political reason*. .*denominations*.--- Political reason is a power by which we deliberate and weigh circumstances, conditions and results, and settle what is right and wrong ('dividing morally') in the practical sense i. e., beneficial to society. It is not merely ascertaining what is right in the abstract or good as regards quantify.

(17)—(p. 73)—*Men have no right to what......monu ments of his folly*. Here the reference is to the story that Empedocles, the celebrated Sicilian poet and philosopher, wishing that people might suppose the gods had carried him to heaven, threw himself secretly into the crater of Etna. But unfortunately one of his brazen slippers was cast out with the lava and recognised by the people.

"He who to be deemed
A god, leaped fondly into Etna flames,
Empedocles ;

Paradise Lost Bk. III., (l. 469—471).

Burke says that men can only claim reasonable things and things beneficial to them. The English people cannot claim a revolution because the French have obtained it. For, though one poet (Empedocles madly destroyed him self by leaping into the raging crater of Etna, yet (he says, sarcastically) it can hardly be supposed that all poets will claim such a sacred privilege *i.e.* seek to emulate themselves in that way ; in the same manner, though one people has plunged madly into the throes of a fiery revolution, there by ruining itself, it can hardly be claimed as a right on the part of other people to ruin themselves in the same way. Burke would in such a case try to save the man out of pity (*i.e.* try to prevent revolutionary principles from spreading into England) than, like Dr. Price, to instruct people to realise their alleged rights.

The *franchises of Parnasus* means the *privileges of poets*. *Franchises* literally means the rights and privileges of a free man. *Parnasus* (a mountain in Greece) was the favourite abode of Apollo, god of poetry and art. Hence it was supposed to be frequented by his followers, the poets.

(18)—(p 74) *It renders the habit of society liberty.*—
Burke conceu ns making the extreme medicine of the
constitution its daily bread for, it is injurious to the habit
of society As violent remedies, such as mercury sublim
ate or cantharides, are injurou to our constitution, so
constant ilk of resistance and re olution, as provocatives
to ou love of liberty, is injurious to the constitution of
the itte

(19)—(p 76) —*Then term ng from the Pisgah pro
mised land Pisgah* is a mountain in Palestine, from the
top of wh ch the I ord showed Moses all the 'land of Gilead
unto Dan '

The poem nh time is this—As Moses from the top of
Mt Pisgah viewed in the distance the promised land
of Canaan, which he was destined never to enter, so Price
from the elevation of his pulpit, foresees prophetically the
future glory of France, though he might not live to take
part in it actually

(20) - (p 83)—*I should have thought that executive
power is* 'Heralds College of the rights of men' means
the Heralds College (A body of officials whose duty is
to grant armorial bearings or coats of arms to those who
have attained position enough to claim them) established
by the rights of men The rights of men had all men
equal, and equally entitled to heraldric honours

Leze Nation—It is imitated from *lese majeste* (High
treason) and applied by the Assembly to the offence of
treason against the nation

Executive powers—There is a double meaning here—(1)
the hangman, as a member of the Assembly, carries into
force the laws of the nation, (2) the hangman as execu
tioner carries into effect sentences of death

Burke means to say that the presenting of the New
Year's address to the King, by the Assembly was an act
of the cruelest mockery Even the public hangman of
Paris (now he has got a vote in the Assembly, as being
a nature's nobleman) would feel pity to employ such terms
of bitter and cutting consolation to any man who might be
supposed to have committed high treason against the nation

: Remark upon Burke's method of spelling, giving
instances - In "waving all this custom" - discuss the
spelling of waving -
- trace in detail Burke's repudiation of the claim
of the Revolutionists to be in any case mere
copyists of an English pattern -
Mention any errors of fact or influence into which
Burke fell through want of correct information
- What references are made - (a) lord George Gordon
(b) Henry of Navarre - (c) Hugh Peters (d) Talley ran
(e) Dr Priestly -
- point out the total differences in character between
between the R. of 1704 and R. of 1688 -
: - sketch Burke's argument that the crowd who
owed to the English statesman & marked to King
William King in 1688 does not imply "a right
to choose our own governors -
3- On what ground does Burke rest his contention
in favour of an Established Church -
4- Characterise Burke's style and examine its
method style & relation & if possible explain
and that have some classical -
: - what what was the effect of the Publication of
the Reflection - were there any Replies to the book -
: Discuss its literary, influences -

Besides these 15 questions I find some notes given on the
following heads -
: a the three constitutional principles preached by dr -
Price - (b) - the composition of the assembly -
(c) the old to monarchy - (d) the old to nobility - (e)
the old to clergy (f) the work of the National assembly
g) the Judicature (h) the army - (i) the financial
system -
And I need not go I hope in detail with the notes
given on these heads and think you yourself can
find out answers in these points - .

1 — Sketch Burke's political views — How were they affected by the Fr. Rev? Can he be accused of "double-mindedness" or tergiversation in politics —

2 — Give a brief account of the party changes in Burke's case — caused by his attitude towards the Fr. Rev. Why were Englishmen generally favourable at heart to the revolutionary proceedings in France —

3 — Illustrate with reply the following criticism
   (a) an abstract truth implies a moral falsehood
   (b) "Wisdom" with to invest arguments of force
   (c) Society is a compact — in fact —
   (d) Wisemen will apply their remedies to evils not to names
   (e) Prejudice renders a man's virtue a habit.
   (f) Kings will be tyrants from policy when subjects are rebels from principle
   (g) Govt is not made in virtue of natural rights —

4 — Write a brief sketch of the main events of the Fr. Revolution to which the Reflections refer. Point out any forecasts of Burke that were actually fulfilled in the subsequent events in Fr.

5 — How does Burke define the Real rights of men in civil society — Enlarge his statement that Under such circumstances — the whole a region of Govt becomes a consideration of convenience — Give the substance of Burke's remarks on.
   (a) Louis XVI
   (b) Fr clergy
   (c) Issue of assignats
   (d) the need of Fr. financiers —

(21)—(p. 83)—*The anodyne draught . . .memory.*—To address a king thus with amnesty, forgiveness, compassion (not unmixed with expressions of contempt) under the pretence of soothing his feelings (like an opiate draught), is not the right way to comfort him, but to increase his memory to the uttermost.

(22)—(p. 95)—*They would reject them. . sustained* The allusion here, as clearly appears by the context, is to the 'hypothetical proposion' put by Euripides into the mouth of Eteocles in his drama of the *Phœnician Women* Cicero says that Cæsar often repeated that passage. But Burke's memory fails him when he says that the Athenian audience 'rejected' them. Those which they thus condemned were the more harmless ones which occurred in a speech of Bellerophon.

Burke says that an Athenian audience would not have endured, even in the unreal life of the stage, to hear a man like Dr. Price exulting over the insults to a king like Louis XVI., any more than they endured, in ancient times, the imaginary Eteocles in Euripides' drama whom they hooted for saying—" If it is even allowable to be unjust at all, it is allowable to be unjust for the sake of obtaining sovereignty."

Burke takes the latter part of the speech to mean—'in the case of, or towards a sovereign (as being always a tyrant)'

. (23)—(p. 98)—*We spurn from us. . ...shoulder— Flower de-lue*—(Flowery light) the yellow iris or water-flag (the symbol of the French King). Here. it means servants of the French court bearing the Royal badge, or members of the royal family.

The allusion here is to the scandalous stories of the Queen of France brought over by those about the Court

Burke says, we reject with contempt the scandalous stories of the French court (especially of the Queen of France) as false, although the persons who import them here add that they are from no other reliable source than the courtiers of the King.

(24)—(p. 99)—*He may then be enabled......Gallican Churches—*

Burke here makes a joke on Lord George Gordon, a half insane member of Parliament, who has lately turned a Jew.

In *thirty pieces of silver*, the allusion is to the story that Judas one of the twelve disciples of Christ, betrayed him to his enemies for thirty pieces of silver.

Dr. Price has shown us &c.—Dr. Price, in his Treatise on Reversionary Payments, and other economical works, it is shown how the English national debt would have been cleared, if certain sums were employed in interest and compound interest.

Burke's sarcasm here is rather farfetched. Gordon, who has lately become a Jew, will be enabled to purchase those lands, lately snatched away from the Church of France, by the national fund of the Jewish community together with a very small percentage (which must accrue to Gordon, who also has had a hand in betraying Jesus, namely, by his apostacy to the Jews, his enemies) on the long compound interest of thirty pieces of silver for 1750 years.

(25)—(p. 104)—*This people refused to change......lamp-iron*—In ancient times the French refused to make any reforms in their laws, simply because they believed that the Popes were infallible and that the laws were formerly made with the sanction of the Popes. At present they would not change their laws, which have received the sanction of their so-called philosophers (like Rousseau Voltaire &c.), simply because they believed them to be infallible; although the Popes had power of excommunication and of preaching a crusade against the heretics, and the theorists have power of slandering and hanging adversaries on lamp-posts.

(26)—(p. 113)—*By this wise prejudice......life*—This refers to the story that the daughters of Pelias hacked their old father to pieces, on being assured by Media, the celebrated magician, that their father will be brought back to youth and vigour by her magical incantations. But Media, in order to avenge the wrongs of her husband's family, refused to perform her incantations when the old man was boiled up in the kettle.

In the same manner, the revolutionists have torn to

system of Empedocles refers to his obscure notion of four successive stages of generation.

The system of Buffon refers to the subordination of orders genera and species, applied to the animal world by Buffon *e. g.* the order of carnivorous animals includes several genera, *e. g.* the genus *felis*, which includes several species, *e. g.* the lion, the cat, &c.

Burke means to say that the geometrical division of the country into *Departments, Communes, Cantons*, &c. made not on any sound doctrine of statesmanship, but on the principle of Empedocles and Buffon, would give rise to innumerable local inconveniencies. A principle applied in the animal world cannot be true in the political world.

(33)—(p. 217)—*Your child comes......fate.—Facies Hip-pocratica* is the old medical term for the appearance produced in the countenance by phthisis, as described by Hippocrates.

"The French Commonwealth has come into the world with evident signs of early dissolution. As Hippocrates of old used to predict sure signs of consumption by examining the physionomy of any man, liable to be attacked by the same disease, so Burke by examining the very constitution of the commonwealth of France predicts its early dissolution.

(34)—(p. 219)—*They reduce men to loose......table.—* The revolutionists say that all men, being equal, must have equal votes, that is, a single individual, a single vote, without respect to merit or order. In this case the counting of votes is very simple—so many men, therefore so many votes. But if inequality is taken into account, there would arise a little difficulty in counting the votes—the votes of so many superior persons are so many times the votes of so many inferior person. Burke says sarcastically, that by reducing all men to equality they have much simplified the labour.

(35)—(p. 219)—*The troll of their categorical......quan-ity.*—This refers to the fact that the French politicians do not care much for the Aristotelian logic, in which there are ten categories, *substance* and *quantity* being among them.

Burke sarcastically refers to this fact and says that the Assembly takes into consideration only two categories—*quantity* (refers to the basis of population) and *substance* (refers to wealth) but leave all other considerations out of account.

(36)—(p. 224) —*By the new French constitution*.....*Patrum*—Here the reference is to the rule of the new French constitution that every man, whether good or bad, who has once served in the Assembly, is not elegible again for the space of two years.

Limbus Patrum is the border, or outside ground between Paradise and Purgatory. The mediæval theologians supposed that the spirits of the Patriarchs after death dwelt in a border land round the outskirts of Hell till the day of judgment.

By the new constitution, the good men along with the bad were to be excluded from the Assembly and condemned to a life of seclusion and inaction for two years.

(37) —(p. 226)—*They have reversed* ...*Delos.*—Here the reference is to the following story :—'I atona, a beauti ful daughter of Cœus the Titan, was in love with Jupiter, for which she was driven from heaven by Juno who also sent the serpent Python to disturb her peace. Being pregnant she wandered from place to place in search of some land where she might be safely delivered. She came to the wandering island of Delos and prayed to Neptune that it might be fixed. Neptune accordingly pinned it to the bottom with his trident, in the centre of the Cyclades. Here she gave birth to Apollo and Diana.

The plain meaning seems to be this :—The value of land was fixed for a long time, but the Assembly by issuing the Assignats has turned it moveable without fixing any rate ; and thus it is contrary to the case of Delos which had floated about for a long time, till the kindness of Latona (by her prayers to Neptune) fixed it in the centre of the Cyclades.

(38)—(p. 273)—*John Doe was to become......Roe*—These were substitutional names for plaintiff and defendant in an action of ejectment. It was abolished in 1852.

Burke means to say that one fiction is to 'support an-
other fiction.

(39)—(p. 273)—*They took on old huge......assembly.—*
They resorted to the old, worn out artifice of Louis XIV.,
namely, that of calling for ' Patriotic Benevolences' (as he
did in the war of Spanish Succession), which served only
to conceal the real ignorance and impotence of the Assem-
bly; thus, they were as if to revive the old-fashioned
perukes of that king's reign to conceal their baldness.

(40)— (p. 286) *- This was a good stout......Apella.—*
Every one holding office in England has to subscribe to
the thirtynine articles of faith Burke says that the Assignat
was like one of the articles of faith, pronounced under the
anathema of the members of the philosophic council.
But, says Burke, whoever is credulous enough to believe
in the stability of your paper money, certainly the Jews
will not (they being naturally very sagacious and cautious).

(41)—(p. 286)—*They cannot bear to hear. ....system—*
The leaders of the National Assembly could not bear that
their paper money should be compared with the fraudulent
Mississippi scheme of Law. They thought that Laws ··
Mississippi scheme was like the house built on sand (in a
parable) which the rains soon washed away, but their
scheme of finances was (they thought) like the Church (in
the same parable) built on rock

(42)—(p. 288)—*But Mr. Bailly......philosophy.—*The
reference is to Bailly's Letters on the subject of the fabled
island of Atlantis (off the coast of Spain) surrounded by
eternal ice. The quotation is from Paradise Lost, Book X
(lines 294-295) where Sin and Death build the bridge over
Chaos

The plain meaning is this.—It is rather possible for Mr.
Bailly to melt the eternal ice round the fabulous island of
Atlantis than to restore the vital heat (order and peace) to
Paris, so long as the latter should remain impregnated with
the false theories of the sophistical philosophers.

(1) *Hortus Siccus*—A collection of dried plants.

(2) *Per càpita*—In the reigning family.

(3) *Per stirpis*—In the reigning person.

(4) *Un beau four*—The Happy Day (refers to Mirabeau's saying).

(5) *Io Pean*—A title of Apollo.

(6) *Jus retractus*—The right of recovery by the landlord of his alienated lands.

(7) *Grand arcanum*—Grand Secret. Literally the secret of transmuting other metals into gold, sought by alchemists in the middle ages.

(8) *Circean Liberty*—Circe was a sorceress, who metamorphosed the companions of Ulysses into swine. It is an allegory of the brutalizing effect of sensual pleasure. *Circean liberty* means the happiness of being transformed into swine and allowed the liberties and indulgences peculiar to these animals, which is like the new liberty obtained by the French.

(9) *Civic Education*—It was a sort of education imagined by the revolutionists in France. It was founded on a knowledge of the physical wants of men, progressively carried to an enlightened self-interest, which, when well understood, they tell us would identify with an interest more enlarged and public. The right pursuit of self interest by any individual will always be the best means of promoting the public interest.

(10) *Munera Terra*—Gifts of the earth.

(11) *Prima fronte*—At first sight.

(12) *Quadrimanous activity*—Four-handed or apish activity; an activity which is destructive or frivolous.

(13) *Pedo nudo Catonem*—Imitating Cato in his bare feet.

(14) *Facies Hipporatica*—The old medical term for the appearance produced in the countenance by phthisis as described by Hippocrates.

(15) *Limbus Patrum*—The border or outside ground between Paradise and Purgatory, as defined by Thomas Aquinas.

(16) *Caisse d' Escompte*—Bank of Discount.

(17) *Serbonian bog*—A dangerous marsh on the eastern border of Egypt.

> " That Serbonian bog
> Between Damitta and Petorchus old
> Where armies whole have sunk."

<div align="right">*Paradise Lost*—Bk. n.</div>

As the Serbonian bog of old swallowed up whole armies (according to Milton) so an oligarchy of bank and stock-jobbers will absorb all the wealth and power of the country to themselves.

(18) *Grand Climacteric*—The climax period of life—the mystical number formed by the multiplication of two uneven and mystical numbers (7 and 9 *i.e.* 63). A superstition of middle ages.

(19) *Hermetic art*—Art of the alchymists. The artifice of paper-money was to the Assembly the ' Philosophers Stone' which was to afford them an inexhaustible support of gold

APPENDIX A.

BURKE'S ERRORS.

Burke is at his best when enlarging on the general philosophy of society ; but he breaks down when he proceeds to its application :—

(1) His opening arguments on the British constitution Pitiful as it is to see the fine mind of Burke self-devoted to the drudgery of Tory casuistry, it is even more so to find h s usually ready and generous sympathies (as the work advances) remorselessly denied to the cause of the French people

(2) His opening address to the French politicians is more than ungenerous : it is unjust It seems incredible that any one should have been found to declare that the path of reform in France was 'a smooth and easy career of felicity and glory', which had been recklessly abandoned.

(3) He knew that France was peopled by a race as oppressed and down-trodden as Ireland or India. Was freedom to be the monopoly of England ? Had Burke no sympathy for any sufferings but those of royalty?

(4) Elsewhere, the House of Lords is asserted by Burke to be a form of popular representation ; in the present work, the Peers are said to hold their share in the Government by original and indefeasible right.

(5) Elsewhere he had said that the tithes were merely a portion of the taxation, set apart by the national will for the support of a national institution. In the present work, he argues that church property possesses the qualities of private properties.

(6) Elsewhere, it is asserted that all governments depend on public opinion ; in the present work, Burke argue that public opinion acts within much narrower limits.

BURKE'S CORRECT ACCOUNTS AND FORECASTS.

Accounts—(1) His description, of the growth of the monied interest, of the hostility of the Paris literary cabal to the Church, and, of the coalition · of these two elements for its destruction, stands forth as a bold and accurate outline of an actual process.

(2) His retrospect of the past glories of France is no mere exercise in declamation ; and his observations on the Government of Louis XVI. prove that he had studied an'e-

cedent events perhaps as accurately as to an Englishman was possible.

Forecasts (1) A mild and constitutional *regime* predisposes to a revolution: if this *regime* is rudely interrupted, or its sincerity rendered doubtful, a revolution is certain. This has been verified in the persons of Louis XVI, Charles X, Louis Philippe, and Louis Napoleon.

Burke was correct in arguing an alteration in the internal balance of power in France from the changes introduced into the army. The substitution of a popular for a merely mercenary force has always been a measure necessary to secure great political reforms; and it leads, as Burke pointed out, to the ascendancy of popular generals. The rise of Napoleon Bonaparte proved the truth of Burke's surmise.

(3) The history of Hayti amply verified all that, he foretold, would follow on the assertion of the rights of men in the French colonies

(4) Among Burke's historical forecasts none is more remarkable than that which relates to the organisation throughout Europe of secret political societies. Contemporary critics laughed the argument to scorn, but its accuracy is testified by the history of liberal movements all over Catholic Europe and America. It was by the aid of these secret organisations that Mexico and South America threw off the yoke of the priesthood.

(5) The great merit of Burke's view of the changes in France consisted in his perception of their actual magnitude, and of the new character which they were likely to impress upon French policy. He was right in supposing that revolutionised France would become the centre of a revolutionary propaganda, and that success would transform the representatives of French liberty into the tyrants of Europe He rightly judged that the spirits of the old despotism and of the new liberty were quite capable of coalescing. Under the Revolution and the Empire, France was as much a prey to the lust of empire, as in the days of Louis XIV.

BURKE'S IDEA OF TRUE LIBERTY.

By *Liberty* Burke means social freedom. It is that state o things in which Liberty is secured by equality of restraint. This kind of Liberty is indeed but another name for justice. Whenever a separation is made between Liberty and Justice neither is in my opinion safe.

The Assembly thinks that all its shortcomings are atoned

toi by the name of that Liberty which they boast of having
given to France. Burke replies that Liberty without wisdom
and virtue is the greatest of evils, that it is easy to form a go
vernment and still more easy to give freedom, but to form a
Free Government, that is, to combine liberty with restraint is a
difficult task, which few minds can perform.

BURKE ON PREJUDICE.

Burke says that old *Prejudices* should not be cast away
They should be cherished, and cherished because they are pr -
judices. Men should not be put to think on their own private
stock of reason ; because this stock in each man is so small
that the individuals would do better to avail themselves of the
accumulated wisdom of ages. Instead of exploding prejudices,
we should employ our sagacity to discover the latent wisdom
which prevails in them ; and when the discovery is made we
should rather think it more wise to continue the prejudice,
with the reason involved, than to cast it away and leave nothing
but the naked reason : because prejudice, with its reason, has
a motive to give action to that reason, and an affection which
will give it permanence. Prejudice is of ready application in
the emergency ; it previously engages the mind in a steady
course of wisdom and virtue, and does not leave the man
hesitating in the moment of decision, sceptical, puzzled, and
unresolved. Prejudice renders a man's virtue his habit ; and
not a series of unconnected acts. Through just prejudice, his
duty becomes a part of his nature.

' APPENDIX B.

B. A. EXAMINATION, 1883.

Examiner—Mr. A. C Edward, M. A.

1   Give the full meaning of the following passages
yith reference to their contexts, explaining all allusions :—

(*a*). It would certainly be a valuable addition of non-
descripts to the ample collection of known classes, genera,
and species, which at present beautify the *hortus siccus* of
dissent.

(*b*). It is the Corinthian Capital of polished society.
Point out an error of Burke's in connection with the
subject of this extract.

"(*c*). The new pavement of square within square, and
this organization and semi-organization made on the
system of Empedocles and Buffon.

(*d*).' They took an old huge full-botton periwig out of
the wardrobe of antiquated frippery of Louis XIV., to cover
the premature baldness of the National Assembly.

2. Give the substance of Burke's argument regarding
the real causes of the confiscation of church property in
France and the pretext assigned for it. Discuss briefly after
Burke, or on general principles, the expediency of a
state-endowed church.

3. What according to Burke, are the duties of a Finan-
cier? How far was National Assembly successful in fulfill-
ing each of those duties? Point out the ill effects of the
Assignat system. What was Burke's main object in his
own scheme for economical reform?

4. Discuss—(*a*) The principal merits and defects of
Burke's style as an orator and as an author : (*b*) The
character of Burke's Political Philosophy, illustrating your
remarks from his work.

B. A. EXAMINATION, 1887.

Examiner—Rev. J. Bell M. A.

5. What circumstances led Burke to write his *Reflec-*   10.
tions? What object had he in view?

How was the French Revolution regarded (i) by the
people of England, and (ii) by Burke?

6. State Mr Morley's opinions of the *Reflections,* (i) as   9.
a political work, (ii) as to its influence.

10. Sketch the character of Burke as a statesman, an   12.
orator, and a friend. Who were his contemporaries in
Parliament, and his friends in social life?

8. Annotate :—

Had your nobility and gentry, who formed the great   10.
body of your landed men, and the whole of your military
officers, resembled those of Germany at the period when
the Hanse Towns were necessitated to confederate against
the nobles in defence of their property—had they been
like the *Orsini* at *Fidelli* in Italy, who used to sally
from their fortified dens to rob the trader and traveller,
had they been such as the Mamelukes in Egypt, or the
Nayres on the coast of Malabar, I do admit that too criti-
cal an inquiry might not be advisable into the means of
freeing the world from such a nuisance. The statues of
Equity and Mercy might be veiled for a moment.

9. State Burke's view of the origin of society.   8
10. Point out the special characteristics of Burke's style.   10
11. How does Burke use the following words ? chant   2
ably, meliorated, well-born, explode, purchase, pleader,
expatiate, lay-divine, officious?

BOMBAY UNIVERSITY QUESTIONS.

12 Write a short account of Burke's career as a man of   10.
letters and statesman Mention his distinguished contem-
poraries in literature and politics.

13. State and criticise Burke's argument, refuting the   10.
statement of Dr. Price that the people of England had ac-
quired the fundamental right to choose their own governors.

14. State Burke's theory as to the real rights of men.   7.
15. Explain—   15.
(a) Everything human and divine sacrificed to the
idol, &c. &c.
(b) They have reversed the Latonian kindness to the
landed property of Delos :—
(c) To destroy any power growing wild from the rank
productive force &c......material.
(d) Sacrilege is no part of their doctrine of good works.

(*) I unhappily was left unfinished in this great history
piece of the massacre of Innocents

16. Discuss the following statement "Our representa-
tion has been found perfectly adequate to all purposes for
which a representation of the people can be desired or
devised. I defy the enemies of our constitution to show
the contrary." Who did show the contrary?

17. Illustrate from passages within your recollection
the use Burke makes of Biblical phraseology.

———

18. Give a brief outline of Burke's *Reflections on the
French Revolution.* Has the work any regular plan or
method?

19. What were Burke's motives personal and public in
writing the *French Revolution?*

20. What was Burke's political association with Dr.
Price?

21. Point out how Burke makes the proceedings of the
Revolution Society the basis of his discussion.

22. How in Burke's letter are the English and the
French Revolutions connected?

23. On what principles did Burke always proceed in
discussing political questions; illustrate them from his
French Revolution?

24. How does Burke explain the breach of continuity in
the succession in 1689.

25. Explain and illustrate the distinction which Burke
draws between the abstract right and the moral right of
the Convention Parliament in 1688.

26. How does Burke account for the violence and con-
fusion in France under the National Assembly?

27. Criticise Burke's criticism of the Revolutionary
movement. Who said of him that "he pities the plumage
but forgets the dying bird" and what exactly was meant
by it?

28. What is Burke's plea for a special representation
of property in the body politic?

29. What according to Burke are the true rights of
man within and without the compact of Society?

30. What according to Burke is the true social contract?

31. Mention sections of Burke's Fr. Rev.' which are
especially argumentative and which are especially an ap-
peal to the feelings

32. What does Burke say of the influence of the Re volution on the mind of the nation and on its public affec tions.

33. How does Burke contrast the influence of the philosophers in France with the influence of Tindal, Toland, Collins, Hume and such deists and theoratical politicians in England?

34. How does Burke divide the English political system and summarise what he says regarding its various phases?

35. State clearly the relative position of the monied interest and the landed interest in France at the time of the Fr. Rev.

36. Describe exactly the position of the French men of letters at the time of the Rev. By what means did they propagate their view and to what effect?

37. Give a sketch of the contrast drawn by Burke between the conduct of Henry VIII. and the revolutionary party in France in the confiscation of Church property carried on by them respectively.

38. To what measure did the National Assembly resort to raise a large amount of ready money after the confiscation of Church lands ? What steps did they adopt towards the old Parliament of France in order to render themselves free from any annoyance in their illegal proceedings ?

39 State briefly the contrast drawn by Burke between absolute monarchy and absolute democracy. Which does he think the great evil and why?

40. How does Burke refute the argument urged by the Revolutionary party for their policy?

41 The Revolutionary party besides blackening the previous Government justified their Revolution by pointing to the low condition of the clergy and the nobility. How does Burke meet the argument (1) as to nobility (2) a to the clergy?

42 Burke, though he never considers the French nobility to be so bad as they were pointed, is still of opinion that they had degenerated. To what causes does he attribute this.

43 State the argument by which Burke combats the claim to toleration urged by the Revolutionary party when they confiscated the Church property.

45. State the advantages and disadvantages of national debts as dictated by Burke.

45. In what manner does Burke defend the possession of capital by the monastic order?

56. In what particulars does Burke contrast the policy of the Revolutionary party with that of a far-seeing statesman? To what points in particular does he draw attention?

47. Burke states that those who undertake to regenerate constitution should be men of no ordinary ability and proceeds to apply the test to the National Assembly. How does he do so?

48. What does he suppose to be the object of the National Assembly in causing all the confusion they did and what great and inevitable evil does he foretell?

49. By what arguments does Burke show that the advantage given to the rich men is really no advantage at all and what remedy does he suggest for giving the people equal political rights and at the same time acknowledging the special claims of rich men?

50. State and criticize the steps taken by the Fr. Revolutionists towards the formation of the executive power